

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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## A Practical Electro-Plating Plant.

We show in the accompanying illustration an excellent and economical arrangement of an electro-plating plant, in which economy of room and convenience of handling work are especially secured.

On the left is a dynamo-electric machine, which furnishes the currents for plating. This machine is run by a 1 inch belt from a neat counter-shaft manufactured for this special purpose. The speed needed is about 800 revolutions per minute. The machine is connected to the rods running across the various tanks by heavy copper wires from two binding posts. One of the rods supports the anodes, or plates of metal to be deposited, and the other the work to be plated. The tank nearest the machine is that containing the nickel solution, as that offers a greater resistance to the current of electricity than either the silver or copper. The solution of cyanide of copper is used as an intermediate deposit upon iron or steel before the nickel, as it prevents the tendency to rust upon exposure, although the nickel may be deposited upon cast or wrought iron as upon steel direct, with excellent results if the articles be properly cleaned. The cyanide of copper is also used for dissolving copper upon zinc, lead, etc., and articles made up of several metals before nickel-plating. Silver and copper solutions, as well as those for brass-plating, are supplied by the manufacturers in ten gallon packages, as well as in barrels which hold some 40 gallons. Nickel is prepared both in the form of solution and salts. The iron vessels in front of the dynamo-electric machine are connected by iron pipes, and have steam coils; they are used for boiling potash, hot water and sawdust. A polishing lathe is shown in the rear of the nickel tank; it is supplied with the proper wheels for polishing the articles, both before and after plating. A resistance board is shown in the circuit to the silver solution. It enables the operator, by turning the key to the right or left, to adapt the power of the current to the amount of work to be done.

An outfit which is often put up, and is very popular, consists of an 8 inch dynamo-electric machine, 50 gallons of nickel solution, the requisite nickel anodes, or plates, and 30 gallons of cyanide of copper solution. Such an outfit costs about \$300. Two cells of what is termed the nickel battery can be substituted for the dynamo-electric machine, and reduce the cost of an outfit to about \$150. Such an outfit is capable of doing a very large amount of work. A sufficient copper deposit may be obtained in 5 or 10 minutes, and of nickel in half an hour, or on small brass articles in 10 or 15 minutes. For smaller quantities of work complete outfits may be obtained as low as \$50. A good deposit of nickel offers many advantages to the manufacturer and exporter of metal goods, machinery, &c., which are greatly appreciated. It is very successful in preventing oxidation, and, owing to its hardness, does not scratch like silver, nor does it tarnish from the gases of combustion, decomposition and the like, as silver is apt to. Hence, it can be used in many combinations where silver is not admissible, as with hard rubber. After the first cost of an outfit the cost of nickel-plating scarcely adds anything to the cost of goods, owing to the present low prices of nickel material. For cutlery, agricultural implements, light machinery, general hardware, tools, and especially articles for export, it must have an extended use. The operation is largely mechanical, its success, where the proper materials are used, depending mostly on the care used in properly cleaning the work for deposit.

We are indebted to Messrs. Condit, Hanson & Van Winkle, of Newark, N. J., for the drawing and estimates.

## An Improvement in Cut Nails.

Messrs. Morris, Wheeler & Co., No. 14 Cliff street, New York, and 16th and Market streets, Philadelphia, are about to introduce upon the market a novelty in cut nails, which will at once attract attention and excite interest in the trade. This is a nail with a chisel point, formed during the process of cutting by an ingenious improvement in the machinery, by which the nail is held firmly clamped, two knives cut down the shoulders of the point, giving it the chisel edge shown in our illustrations. The object of the chisel pointing is to enable the nail to penetrate the wood by simply displacing the fibers. As is well known, the square ended nail of the common pattern enters the wood by breaking down the fibers which oppose its passage when driven in at right angles to the grain. The difference is well shown in the accompanying cuts, which

are in no respect exaggerated. When the chisel pointed nail is so driven that the line of its edge is parallel to the direction of the grain, it merely pushes the fibers aside; when the line of the edge is at right angles to the direction of the grain it cuts and then displaces. In either case it beds itself in solid wood, while the blunt nail beds itself in broken fibers as shown. The chisel nail has, therefore, a much firmer hold upon the wood than the blunt nail. The manufacturers claim that it requires double the power to draw it; also, it drives straighter and penetrates hard wood much easier than the blunt nail.

The special value of this improved nail is found in the fact that it can be used as a finishing nail with decided economy. The price of finishing nails is \$1 per keg over that of common cut nails; that of chisel pointed, 25 cents

per keg. It is claimed that they will not split the smallest moldings, and can be drawn at the extreme edge of a board. Another advantage is that it beds itself so firmly that no space remains into which water can penetrate to rot the wood or rust the nail. For car work and all outside construction, such as clapboarding, shingling and fencing, the saving in metal resulting from the champing of the corners gives a larger number of nails to a given

## Metric System—The Other Side.

A correspondent of the Boston Medical and Surgical Journal writes, in opposition to the project of adopting the French system, which recently has been started with a good deal of animation in Boston. The writer says:

It is well known that this system, attractive as it is at first sight, has never been entirely pop-

ular even in the country of its birth, and that the old denominations of weights, measures and currency are still in common use in France, especially among the masses and in the rural districts.

The reason is that the natural method of subdivision is not by decimating, but by halving and quartering. If you wish to divide a string, an apple, or a bar of soap, it is very easy to cut it into halves or quarters or eighths or six-

teenths by the eye with a good degree of accuracy; to divide it into thirds, fifths, or tenths is extremely difficult, and requires nice measuring and weighing. Now tradesmen, grocers, apothecaries and the like always divide first by the eye, and then verify with the scales. Our present system, confused as it is, is in conformity with this natural method of subdivision, hence its popularity and convenience.

This defect of the decimal system has always been felt, even in arithmetical notation. Hence a duodecimal system of notation has often been advocated by mathematicians in place of the decimal one now in use. The number 12 has four factors—2, 3, 4 and 6; while 10 has only two—2 and 5. It is evident that calculation would be facilitated by such a notation.

Our present system of weights and measures is a duodecimal system based, as all the world knows, on the Roman *as* and its twelve *unciae*. It is universally known both in Europe and America. It has stood the test of 2000 years. It is an old friend. Let us spare it.

We know the national fondness for innova-

tions; let us remember that there is another "great nation" which has a similar weakness, and that French experimentations are not always attended with the most imposing results.

We have no time to criticise the nomenclature of the new system, or its utter inconsonance with natural and pre-existing standards.

Perhaps enough has been said to show that there are objections to it, not only practical, but scientific and mathematical.

## Importance of Studying Natural Philosophy.

At a late engineers' meeting in England, Mr. Alexander Smith read a paper on the need of science in invention. We quote a paragraph:

It has been far from an uncommon thing for ingenious and clever men to waste their time

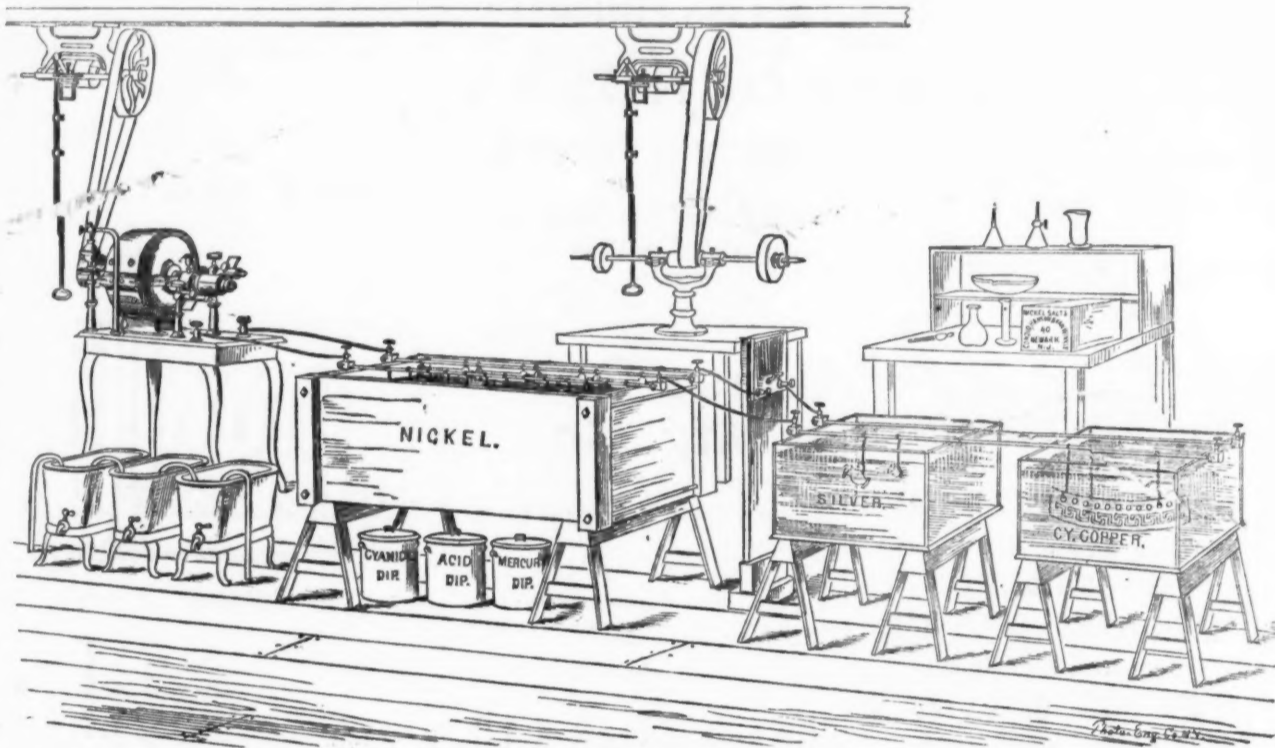
create matter, and it is equally impossible to destroy it. Power or force is exactly subject to the same conditions as matter in these respects, and when effect is to be gained an equivalent power has to be exerted, or, in plain words, the work done by any machine is the same as the work applied. The discovery that power is indestructible is one of recent date. Count Rumford found that in boring cannon by horse-power sufficient heat was given off to boil water; heat, in fact, is nothing more than another form for motion, and whenever you exert power heat is generated. Dr. Joule brought this discovery to a practical basis, for he determined the mechanical equivalent of heat, which is that a weight of 772 pounds falling through a space of 1 foot will generate sufficient heat to raise the temperature of 1 pound of water 1° Fahr.

Gravity acts separately upon every particle of matter, and consequently equally upon all bodies, so that a weight of lead and a feather, if dropped from any height, would reach the earth together if it were not for the resistance of the atmosphere. I have known the peculiar properties of water or other liquids often puzzle even mining engineers, who could not understand how they communicated pressure. Any bulk of water presses equally downward, upward and sideways, according to the head which is connected with it, and this equivalent to 433 pounds per square inch for every foot in depth. I will not trouble you further, but if my remarks induce young members to study the important laws and conditions of nature I shall be extremely gratified.

The French shore of the Mediterranean divides into two distinct parts, which offer a strange contrast to each other. From Genoa to Marseilles all is life and beauty—"all the world" goes thither for pleasure or health. From Marseilles to the coast of Spain, one finds everywhere solitude and desolation. The latter region was at one time highly prosperous, but it has been entirely changed by the immense quantities of sand and mud brought down by the rivers. Narbonne, in the time of the Romans, communicated directly with the sea. It had its lagoon, like Venice, and a deep canal afforded passage to heavy merchant ships and fleets of the imperial fleet. The lagoon is now blocked up, and the commerce, wealth and activity are all gone. Arles was another very important city; it had two ports, like Alexandria, and was so rich and powerful that a poet of the fourth century spoke of it as the "Rome of the Gauls." The Rhone, with its annual 17,000,000 cubic meters of sediment, has been its ruin. So with other cities; but while they have become separated from the sea, agriculture is gradually taking possession of the land won from the water, and the vine and olive may yet restore a part of the ancient prosperity.

The *Polytechnic Review* has hunted up the following in regard to "periodicity" of severe winters, which is of considerable interest at the present time, though we must confess it is not very encouraging. A memoir by Renau, the distinguished French meteorologist, upon the periodicity of severe winters, although published many years ago, has recently been quoted in defense of the opinion that such periodicity actually exists. According to Renau, rigorous winters return about every forty-one years. They are arranged in groups, generally composed of a central winter, and four or five others disposed on either side of it, within a space of twenty years. Mixed with these years are others also of unusual warmth, in such a manner that the mean cold of the season is not sensibly altered. The period of forty-one years seems to be that which corresponds to the maxima of the solar spots at the same season of the year. A central cold winter arrives eighteen months after the maximum of spots has coincided with the warmest season of the year. The severe winters seem to alternate between the northern and southern hemispheres of the earth.

The British Admiralty has been made the victim of an extraordinary hoax. A fictitious telegram was sent about six weeks ago to the port admiral at Cork, ordering the gunboat *Goshawk* to proceed at once to Gibraltar. The terms in which this telegram was couched were such as to leave no doubt of its being genuine; the number of the crew and the amount of coal were duly detailed, and in less than 24 hours after the receipt of the orders the *Goshawk* steamed out of the Cove of Cork, leaving the fisheries, which were under her care, entirely defenseless. Fortunately, a genuine Admiralty telegram, asking if the *Goshawk* had sailed for Galway, aroused the suspicions of the authorities at Cork, and the hoax was discovered. Telegrams were instantly dispatched to all the ports on the way, and one of them reached the captain of the vessel in Vigo Bay, where he had taken refuge during a gale. The vessel returned to her berth at Cork on Dec. 30.



ARRANGEMENT OF AN ELECTRO-PLATING PLANT.

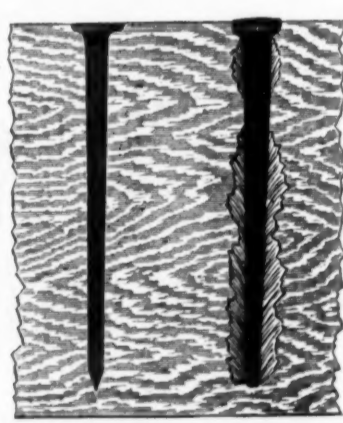
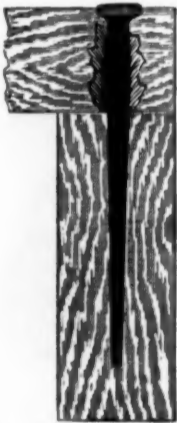


DIAGRAM SHOWING THE EFFECT OF NAILS UPON THE STRUCTURE OF WOOD.

weight, and as fewer are needed for a given amount of work, the manufacturers claim an appreciable economy attending their use.

There have been so many accidents on the English railways of late that certain kind-hearted London editors have revived the French theory of color-blindness as a probable explanation of an engine driver's neglecting to heed a danger signal. A medical expert, Haynes Walton, strengthens the theory by reciting this incident: "A few years ago I was investigating color appreciation, and the first instance of the acquired defect that came to my knowledge was in the person of an engine driver. The man confessed, after an accident through not distinguishing the red signal, that he had gradually lost his color power, which had been perfect." A manager of the company assured the expert that the driver had been carefully examined only a few years before, and passed as having perfect sight. The *Pall Mall Gazette* sagely remarks that the evidence would have been less open to suspicion if the

engine driver had confessed to his color-blindness before instead of after an accident. The same paper apprehends that color blindness may become as popular a defense to certain indictments for manslaughter as insanity is to charges of murder. The hint will not be taken on this side of the ocean. Not that American engineers are more honest, but that there is no risk of being indicted.

Our present system of weights and measures is a duodecimal system based, as all the world knows, on the Roman *as* and its twelve *unciae*. It is universally known both in Europe and America. It has stood the test of 2000 years. It is an old friend. Let us spare it.

We know the national fondness for innova-

his shoulders. He managed very well till the bottoms came out of the cans, and the cylindrical portions flew up his legs. Unfortunately for themselves, a large portion of those engaged in engineering (mining, civil and mechanical) and other scientific pursuits never begin low enough, i. e., with the study of natural philosophy; or they disregard it as being of no moment, or too elementary, while others are only practical men without theory, and, consequently, strangers to the facts. Practice can feel its way a considerable distance without theory, but theory is of very little service without practice, as 10 minutes of the latter will sometimes upset 10 years of the former. The two together are valuable, and is the happy medium we want. In the instances I have related, had those interested known and kept in mind the fact that under no circumstances whatever is it possible to create power or force, they would have saved themselves much trouble.

I would urge, upon young members especially, to closely study natural philosophy, and to keep in mind the following facts: It is impossible to

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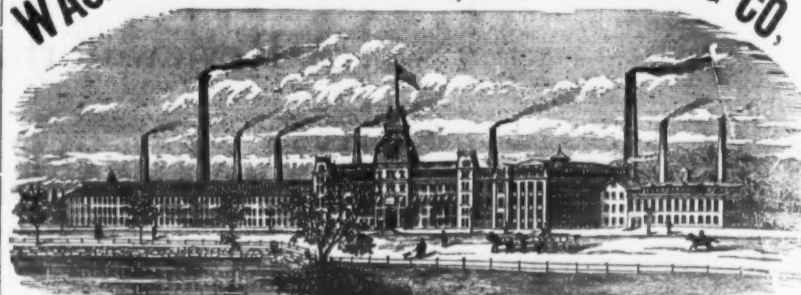
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published some time ago in the New York papers, containing a proposition to Congress to appropriate money, ship, and the necessary equipment for another expedition to endeavor to reach the 'North Pole,' and I heartily concur with you in the plan therein suggested as the

An Erie Railway train that stopped at Binghamton on January 13 had a figurehead standing in front, under the head-light, and covered up to the ears with snow. The figurehead stepped down, and, walking back to the fourth car, remarked to the conductor, "Didn't I tell you I'd get here ahead of you?" The young man had been put off the cars at Waverly for not paying his fare, and had surreptitiously climbed to his post on the engine. The conductor was beaten by four cars' lengths.

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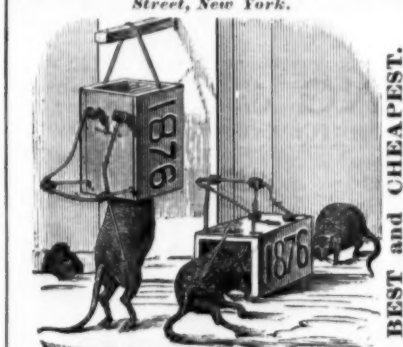
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## The Ashtabula Bridge.

Mr. Amasa Stone, late president of the Lake  
Shore Railroad, in his testimony before the  
Legislative Commission on the 17th instant,  
said:

I was at first superintendent of the Lake  
Shore Road, between Cleveland and Erie, for  
two years; was then president from 1856 until  
1875; have since then been a director of the  
road; the Ashtabula bridge was erected in the  
autumn of 1863; I designed the bridge; I only  
superintended the making of the plans; the de-  
tail of the iron work was done by Albert Cong-  
don, supervised generally by Mr. Tomlinson;  
have not the original plan of the structure; do  
not know where it is, but suppose it is in the  
office of Charles Collins, chief engineer of the  
road; there were all the specifications usually  
given for the construction of the bridge (bill of  
materials produced); full specifications were writ-  
ten at the time; they were prepared by me,  
except some minor details; cannot tell where  
the original specifications are; have seen nothing  
of them since the building of the bridge  
until within a fortnight; this paper (paper pro-  
duced) was copied from the order book of the  
Cleveland Rolling Mill Company; it was handed  
me by my brother; I made up the figures at the  
time in reference to the strain on the bridge;  
am not aware where the paper is or whether it  
was preserved up to the time of the disaster;  
the bridge was 15 feet between the bearings;  
the width of the bridge, including chords from  
outside to outside, was 19 feet 6 inches, accord-  
ing to my recollection; the width was, inside  
of the chords, 14 feet, I think; the width of the  
truss was 2 feet 6 inches, and the height 20 feet.  
There were 14 panels of 10 feet each. There  
was no change of plan after the work was pro-  
jected by me. There was no departure, as the  
bridge was finally erected, from the size or  
strength of the bridge as planned by me, but  
there was an error by the constructors which  
gave a good deal of trouble until erected. A  
brace was put in horizontally when it should  
have been vertical. The original design was 4 by  
7, to my recollection. When advised that the  
bridge was being put up slowly and did not come  
together right, I went down myself and found  
the braces were being put in wrongly. The  
change of righting the braces was made before  
the bridge was finished. The superintendence of  
construction was in the hands of Mr. Tomlin-  
son, until I found him inefficient and discharged  
him; afterward it was in the hands of Mr.  
Rogers. I do not think he (Rogers) had ever  
put together an iron bridge before; do not know  
whether he has since or not. He had had some  
years' experience in building. The dropping of  
one or two counters would not effect the destruc-  
tion of the bridge. My impression is that if half  
the counter braces were out it would not cause the  
bridge to drop. The counter braces enable the  
bridge to stand a shock and stand the traction of  
a train going at full speed. They have little ser-  
vice to perform except to stand a shock. The dropping  
out of a single counter would not result in the  
destruction of the bridge under a weight of 300  
tons above the dead weight. The lugs were  
put on more for convenience in raising than for  
any special purpose. After erecting the bridge  
the braces were held by clamp bolts at intersec-  
tions that with friction I should think would be  
sufficient to keep them in place. The tie rods  
would elongate to the eighth of an inch, unless  
they were too weak for the purpose. The lateral  
bracing between the lower chords was  
2½ by ½ inch flat bar. I do not remember how  
close together they were, but I think they came  
together throughout the length of the bridge,  
intersecting each other. They were in every  
panel, and braced every inch of the bridge.  
The bridge was so very thick that it would have  
been a great deal safer without any lateral.

A large photograph of the bridge was ex-  
hibited by Mr. Stone and examined by the mem-  
bers of the committee. As to details of con-  
struction Mr. Stone continued: I have known  
bridges erected without any lateral braces be-  
tween the tower chords and stand for years.  
There were three 7 inch beams to each rail;  
there were three stringers bolted and lapped  
together, and over these two stringers and bars  
connecting and spiked. It is usual to have the  
beams rest upon the top chord; it has always  
been done. The nature of the strain upon an  
upper chord is a thrust; the top chords were  
4x7 inch beams, five of them T-shaped, a flange  
½ inch thick by 4, a ½ to 1 inch web. The  
web was thicker in the middle and lighter at the  
end. Those chords would stand a thrust stroke  
of 35,000 pounds to the inch. The dead weight  
of the bridge was something over 100 tons, ac-  
cording to my impression; but it must be re-  
membered that there were two trusses, includ-  
ing rails and cross-ties. My impression is that  
the dead weight was a ton to the foot run.  
The tracks were 7 feet apart. The center of  
each outside rail of each track was nearly over  
the center of a truss. A bridge to carry two  
tracks would have to be quite twice as strong  
as a bridge to carry one. I have carefully con-  
sidered the matter, and my conclusion is that  
the dead weight of the bridge—even with two  
trains upon it—would not strain any portion of  
the iron more than 8000 or 9000 pounds to the  
square inch, while it was capable of resisting a  
strain of at least 10,000 pounds. One train  
would strain the bridge about 85 per cent. of  
what two trains would strain it.

It is very conclusive evidence to my mind that  
the bridge was carried down by the second lo-  
comotive in some way leaving the track. The  
bridge was not strong enough to carry a train  
derailed. Had the bridge broken from its own  
weakness I am convinced it would have fallen  
to the south. I am convinced that a model  
tested to the extent of breaking a truss would  
show that that truss would fall to the south and  
pull the bridge to the south. An engine drop-  
ping on the floor beams would tend to deflect  
them and pull the truss inward to the north,  
and when pulled to the north from the vertical

to a small extent it would then go down. The  
bridge fell to the north. I have constructed  
from 10 to 15 miles of Howe bridges; do not  
know of another Howe bridge anywhere with  
wrought iron braces; do not think it was ne-  
gligence in again intrusting Mr. Rogers with the  
construction of the bridge, after finding that  
he had put the braces in wrong at first. There  
was no other particular in which he could make  
a mistake in following the original plan. The  
sway rods were placed at every panel 11 feet  
apart; do not recollect the details as to how  
these rods were fastened. The chief braces and  
counters, as originally projected, were to be  
4x7 inch T beams. There were five braces  
throughout the bridge in each panel and at the  
ends six; in the middle there were three mains  
and two counters, near the ends four mains and  
one counter, at the ends six mains.

At the time the bridge was built I had not a  
dollar of interest in the mill where the iron was  
rolled; was not an owner of any until some  
time after I left the charge of the road, and  
then was only a small owner. Mr. Collins had  
general charge of examining this bridge; such  
a structure as that bridge, on such a road as the  
Lake Shore, if it had stood 11 years without  
showing any weakness, would not likely be ex-  
amined every day. Common prudence would  
require that the bridge should be thoroughly  
examined at least every three months, and by  
the trackmen quite frequently.

The cars might have taken fire from the loco-  
motive or the heaters in each car. I examined  
some patent stoves, and my conclusion was  
that they were more dangerous than the ones  
we were using. It is impossible to heat cars by  
steam from the locomotive. My opinion is that  
no stove could be provided which would ex-  
tinguish its fire in case of accident; never heard  
of any difficulty with the bridge after the build-  
er's mistake of putting the braces flatwise in-  
stead of vertical, as provided in the plan, was  
remedied. Have never used the expression in  
regard to the Ashtabula bridge: "That's not  
my bridge." I never thought it, and I don't  
know why I should have said it, as I never  
shrink responsibility. A stone viaduct or arch  
would have been preferable, but at that time  
our funds were rather short. We were trying  
to build a perfect road, and thought we had  
a perfect bridge. Did not give my personal at-  
tention to the bridge as it was going up. The  
iron work was done by as thorough a master  
machinist as I knew of, and when he worked  
at the plans I was at the shops frequently ex-  
amining those parts as the machinists were at  
work; I was present at the raising of the bridge  
only three or four times; was present at the test  
before the trains were put upon it; when the  
test was made the bridge was stiffer and  
showed less deflection than I had expected; the  
difference in cost between an iron bridge and a  
stone arch there at that time would have been  
about \$15,000; the iron bridge itself cost about  
that sum; the total expense, including mason-  
ry, might possibly have been \$70,000.

The London papers record an extraordinary  
shooting feat performed recently by Cholmon-  
deley Pennell. He had long odds that he could  
shoot consecutively 100 pennies tossed in the  
air. He selected some of the old Georgian  
coins, as being heavier than the modern bronze  
pieces, and less likely, therefore, to be caught  
by the wind. An old soldier threw each penny  
up three feet above his head, and as he threw  
Mr. Pennell fired with small shot, and hit every  
one of the 100 coins. He had about half a  
dozen over, and offered to bet any of the spec-  
tators that he would hit those as well. But  
they were more than satisfied, for Mr. Pennell  
had won £250 of them, making the money in a  
little more than an hour. The story is so  
curious that it may be well to remember that  
the hero, beside being an inspector of fisheries,  
has been a contributor to *Punch*.

The great phosphate beds of South Carolina,  
and possibly a number of other localities, are con-  
jectured with reason to have originated thus:  
All fish that swim together in what are called  
schools die together in vast heaps, and in por-  
tions of the Atlantic well known and ascer-  
tained. The researches of African explorers  
have discovered an elephants' graveyard, where  
hundreds of tons of ivory strew the ground,  
but it is so far from the sea coast as to be al-  
most lost to commerce. The dogs in Constanti-  
nople know when they are on the point of  
death, and repair to the barge which is main-  
tained for the purpose of conveying defunct  
canines to the lonely island in the Bosphorus,  
where the dog's potters' field is situated. In  
short, an eminent French savant argues that all  
animals, birds, fish and insects possess, in com-  
mon with man, this graveyard system, and from  
this position he argues that animals reason.

The London *News* describes an American rail-  
way car as a "store-house of inflammable mat-  
ter." "In each car," it adds, "is a huge stove,  
very often quite open all the time. Its furnace  
is roaring loudly as 'the merry logs of Algidus'  
in the Roman winter evening, which Macaulay's  
ballad describes. Sometimes there are two  
stoves, one at each end of the car. Near each  
stove is a vast deposit of logs, and whenever  
the fire shows the slightest tendency to burn  
low, some passenger is heard to grumble, and  
the negro attendant heaps wood on until the  
stove roars and crackles again." We are sorry  
the editor of the *News* did not have time to visit  
us last year.

The English sparrows have deserted Boston  
and gone West. A resident of Cambridge, who  
has had leisure to watch the birds, and has kept  
food for them on his premises ever since the  
first snow fell, observed a falling off of the  
attendance upon his daily collation last week,  
and on Sunday he had only one partaker of his  
bounty. He also noticed that large gatherings  
of the sparrows generally ended in a high flight  
and a disappearance of the flock in the West.  
They were evidently disgusted with the climate  
of Boston.

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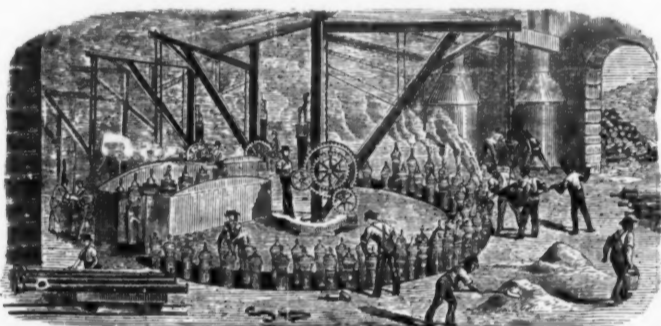
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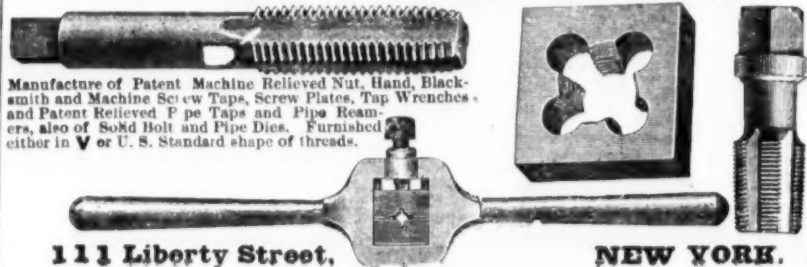
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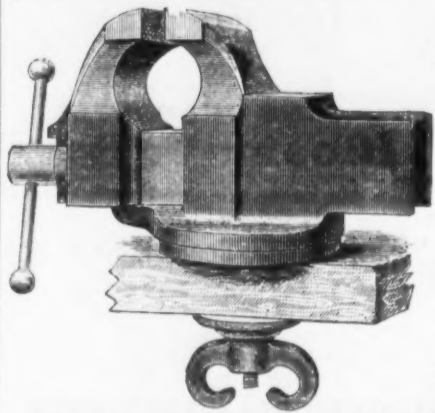
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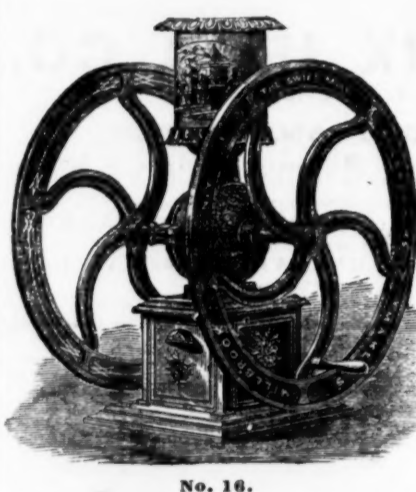
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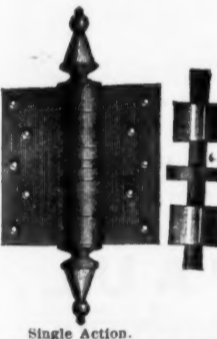
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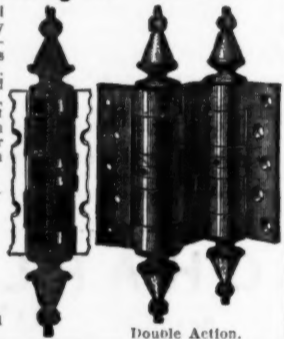
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**Scientific and Technical Notes.**

The *Edinburgh Review*, in a recent article on "Railway Profits and Railway Losses," presents some curious facts with regard to the increasing

WEIGHT OF ENGLISH ROLLING STOCK, which seems to have been going on as steadily in that country as here. In cases of collision it was found the old carriages suffered most. As trains became longer, therefore, and speed more rapid, it was necessary to make carriages larger and heavier; and experience has proved that increase of weight means decrease of tear. Of the carriages now used on the Metropolitan line, the first, second and third class carriages weigh respectively 15, 14.75, 14.25 tons, and seat 48, 64 and 80 passengers. The weight of the locomotive engine has also steadily advanced. In the Liverpool and Manchester competition of 1829, the Rocket, which won the prize, weighed 4 tons 5 cwt., and its tender 3 tons 4 cwt. Five years later the Atlas, a 6 wheeled engine on the same railway, weight, 11.4 tons in working order. At first, rails weighing 35 pounds to the yard were deemed adequate, but as these could not bear a 9 ton engine, they were replaced by new rails weighing 66 pounds per yard. In 1830, 7 ton engines were deemed heavy; in 1849, 15 ton engines; in 1850, 25 ton engines; and in 1860, 35 ton engines. Now there are good engines on the continent that weigh, exclusive of tenders, 45 tons. Mr. Meyer's 12 wheeled engine, exhibited at Vienna in 1873, weighed 60 tons. There was a weight of 10 tons to each pair of wheels, and the tractive force was estimated at 22,000 pounds, equal to the draught of 2300 tons, exclusive of engine, on a level; 340 tons on an incline of 1 in 40, or 155 tons on one of 1 to 17. At the speed of 880 feet per minute, the effect of this engine corresponds to 587 horse-power.

While we have not the facts at hand in regard to the following

**NOVEL USE OF PAPER,**

yet as a material for sheathing or use under water, paper is altogether admirable when a proper cement or water-proof substance is used. No material, perhaps, has been of late years subjected to so many new and novel uses as has paper. Articles formerly made of iron, tin, wood and cloth have been supplanted, and in many instances have been marvellously well counterfeited by paper. It has just come to be applied to a still more notable use, that of a covering for the iron hulls of vessels. For a long time it has been an interesting and apparently unsolvable problem as to how the submerged hulls of ships might be preserved from corrosion, and sea grasses and barnacles be prevented from gathering on them. Beside ruining the plates, the latter increase frictional resistance and diminish the speed of the vessel. The Patent Office has been flooded with devices and preparations for this purpose, but all have proved more or less ineffectual. Nautical men and chemists have been engaged in searching anxiously for the remedy. A short time since a vessel was placed in the dry dock at Portsmouth, England, for examination and repair. For some purpose several sheets of heavy sheathing paper were made to adhere to the bottom of the vessel, by means of a marine glue, before the vessel was launched from the dock. A voyage of some months duration followed, after which the vessel was again placed in the dock. Upon examination of the ship's bottom, it was found that every part of the hull below the water line was covered with weeds, grasses and barnacles, except the papered portion. A cute officer of the Royal Navy "had an idea;" he kept it to himself; he made further experiments with success, and soon had a patent for papering ships' bottoms. In this discovery the officer has reaped a rich harvest, and has given to the nautical world a valuable adaptation of that material, the varied uses of which seem almost inexhaustible, and the fullest limit of which has certainly not yet been reached.

A curious set of experiments made in France developed some interesting facts in regard to the greatest average

**LOAD FOR A MAN**

of great strength to carry a short distance. This was found to be 319 pounds; all a man can carry habitually, as for example, a soldier his knapsack, walking on level ground, is 132 pounds—an extreme load, it would seem—or he can carry an aggregate of 1518 pounds over 3300 feet as a day's work, under like circumstances. If he ascend ladders or stairs as do hod carriers, then he can carry but 121 pounds continuously, and his day's work cannot exceed 1232 pounds raised 3300 feet high. With regard to the effort and the velocity with which a man can produce by pulling or pushing with his arms, it has been found by these experiments that, under the most favorable circumstances, and for continuous work, an effect cannot be gained exceeding from 26.4 to 33 pounds raised from 1.8 to 1.2 feet per second, or about one-eighth horse-power.

Last month there was a very interesting meeting of the English Society of Telegraphic Engineers, at which there was the usual extensive

DISPLAY OF TELEGRAPH INSTRUMENTS and other apparatus connected with telegraphy, but only one or two objects could be regarded as coming within the category of new inventions, and of these the most interesting appeared to be a new form of cable grapnel, exhibited by the Western and Brazilian Telegraph Company, and explained by Mr. A. Jamieson, who has for some years past been associated with the operations of foreign telegraph companies. Cable lifting being an operation moved far beyond the sphere of ordinary observation, most people are ignorant of the peculiar difficulties by which it is surrounded. Of these, the breaking of grapnels is one of the most frequent and serious; and Mr. Jamieson's invention, which is designed to overcome this difficulty, can hardly fail to prove a boon to foreign telegraph companies, of which so many have sprung into existence

in recent years. The ordinary grapnel is furnished with rigid prongs, which, although perfectly well calculated to seize and bring a cable to the surface, are also liable to become fastened to rocks and other substances, and to break with the slightest strain of the ship. Of such frequent occurrence is this, indeed, that all cable ships are compelled to carry a very large stock of grapnels on board, and have often to return to port without accomplishing their task, owing to loss and breakage. Mr. Jamieson has furnished his grapnel with hinged prongs governed by a spring, which yields at a given strain, so that the moment a rock is "hooked" the grapnel slides off and comes to the surface. It is, in fact, an octopus-like machine, which puts forth its "feelers" in search of the real article, and draws them back the moment any counterfeit substance seeks to entangle them. This, with the new mariner's compass exhibited by Sir William Thomson, was perhaps the most interesting and valuable feature of the display made at the meeting. The Society of Telegraph Engineers, which now numbers upward of 800 members, was founded by Major Frank Bolton, the present water examiner of London, and Major C. E. Webber, of the Royal Engineers.

In an English patent numbered 1476, granted to J. G. Tongue, and dated April 6, 1876, we find the following particulars: This invention relates to a new or improved process of manufacturing imitation or artificial leather,

**"TEXTILE LEATHER,"**

and in the application thereof to various useful purposes. The base or body of the composition constituting the new manufacture is composed of cotton or cotton waste (according to the quality of textile leather to be produced), or of any other textile material which can be carded and used as cotton, also wool or any kind of animal hair which can be felted into sheets of wadding or carded felt uniform. The sheets are placed on a table of polished metal plates, having a false bottom, and heated by steam; the sheets of wadding or felt are impregnated with animal glue or size, made of a concentrated decoction of rabbit, hare, cat or dog skins deprived of hair, waste of skins or green leather, guts and membranes of all kinds of animals, which have first been well cleansed and then cut into narrow strips. When the decoction is well clarified and of sufficient substance, and made hot, the coloring matter which is to be given to the leather is added, with a slight addition of glycerine, which varies according to the suppleness and elasticity required. The sheets of wadding or felt, after being well saturated with the decoction, rollers are passed over the surface in order to make the sheets of a uniform thickness, which are left until the watery part is completely evaporated. This improved textile leather can be used in place of natural leather, and may be employed in particular for covering tables, chairs, sofas, traveling bags, lining of hats, caskets, carriages, harnesses, military equipments, slippers, book binding, and many other uses to which it may be applicable.

Our readers will doubtless remember that on the 7th of last January skating was commenced on Mr. John Gamgee's first sheet of artificial ice, 430 square feet in extent. A thousand square feet—the size of the rink at Chelsea, which is still frozen—was the second attempt, and now

3090 SQUARE FEET OF ARTIFICIAL ICE, solid and transparent, may be seen and used at the floating swimming baths on the Thames, at Charing Cross. The floating baths were handed over to Mr. Gamgee on the 20th of October last, and within two months two complete sets of machinery, with all the accessories necessary for a rink, have been satisfactorily erected. The general principles of the floating rink are similar to those of the one at Chelsea. They consist of the circulation of a current of glycerine and water through a series of metal tubes immersed in water, which is converted into ice, and maintained in that condition. The details, however, are different. There are two ice machines with the necessary engines, one at each end of the structure. Each machine absorbs over 100,000 heat-units per hour, and it is stated that this immense effect is obtained by the expenditure of about six horse-power per machine. The water of the Thames, at a temperature of about 40° or 42° Fah., pumped freely through the condenser, maintains the pressure in the machine at a minimum of one atmosphere and three-quarters, whereas the pressure in the refrigerator is only nominal, and corresponds to the temperature of about 0° Fah. A rotary pump drives about 4000 gallons of glycerine and water per hour through each refrigerator, and this cold liquid traverses through the tubes of the rink, and water outside them is thoroughly frozen. The special difficulties in maintaining ice at the Charing Cross baths arise from the great radiation from the iron structure, which is caused by its immersion in the waters of the Thames, and by the extensive area of glass roof covering the whole in, which greatly raises the temperature of the internal atmosphere. The desired result, however, has been attained, and ice two inches thick has been already formed and skated upon, in the first instance, by two ladies. The machines act as twins. One supplies each alternate tube of 115 feet in length, and the glycerine, having passed through this, gravitates into the other machine and, having been conducted through the refrigerator, passes back through the adjacent tube. In this way Mr. Gamgee secures what he terms his "direct alternative" circulation, which is the special improvement in the floating rink. Each machine is capable of controlling the entire circuit of pipes, so that, in the event of one failing, the other insures the continuance of the process of freezing. It has been demonstrated, in fact, during the process of making the ice, that one machine is about sufficient to absorb the heat of radiation, which is exceptionally great in the floating structure. There

is over a mile of flat wrought iron tubing. The freezing machines have been constructed by Messrs. Raoul, Pietet & Co., the patentees of liquid sulphurous acid. It is so arranged that when the bathing season again approaches, the ice machinery and apparatus will be taken down and stowed away, to be replaced for active use after the summer season.

**The Anti-Clinker Grate Litigation.**

The *Troy Whig* has the following interesting matter in regard to the famous anti-clinker grate controversy. We copy the article entire:

Most of our readers are probably familiar with what is known as the modern anti-clinker principle in the construction of stoves. As the manufacturing of stoves is one of the most important branches of our local industry, and as the question seems to enter into our local matters just now to a great extent, so far as this interest is concerned, a short description of the subject involved may prove interesting to our readers. Upon the adoption of self-feeding stoves that are designed to run as understood, with a continuous fire, the debris beyond the deposit of ashes would accumulate upon the grate; the ashes would, to a large extent, pass through the crevices of the grate, but the clinker and slag would not. Shaking the grate removes the ashes, but the slag and clinker would remain to choke and interfere with the operations of the stove.

James Spear, of Philadelphia, in 1870 designed a stove with a fire-pot grated at the lower edge, and with the grate hung below the fire cylinder, with an intervening space, and which space permitted the introduction of a poker to clean the grate from the accumulations of clinker and slag above named. He was the first, as we are told, and as seems to be generally understood, to do this and make his application of it valuable to the public by its introduction and practical use. Another new feature in stove structure had its birth about the same time, and this was the invention of Elihu Smith, of Albany, a former Trojan, whereby a sur-base flue system was introduced. These two principles of construction as combined now enter into the arrangement of most of the parlor heating stoves, as they are termed, that are made. Like all great things, however, in the way of invention, there has been a dispute as to who made the invention; but a large majority of the stove manufacturers of the United States have, after consultation, come to the conclusion that Spear was the first inventor of the anti-clinker principle, so called, and that Smith first applied and used the enclosed flue at the rear connected with a sur-base flue. A large majority of the stove manufacturers of the United States, feeling anxious to award to the honest inventors of these important features the tribute of discovery in stove structure, have formed an association and have purchased the Spear and Smith patent and paid the inventors liberally therefor.

They have done this after the best legal authority that could be had was consulted, and had examined the proofs as to priority of invention. We are pleased to learn that they do not propose to make an arrogant monopoly of the invention, but have concluded to license parties to make and sell the same at merely nominal terms. Somebody was really entitled to an award for this meritorious invention, which has added so much comfort and convenience to our means of keeping warm. This is as it should be. Monopolies are distasteful to the good sense of the community, and only breed trouble and dissatisfaction.

However, there are still parties who do not recognize the claims of either Spear or Smith. One of these (and we have not learned of any others) are Perry & Co., of Albany, and this firm were yesterday sued by the owners of the Spear patent. A bill was filed, as we understand, day before yesterday in this district, claiming one hundred thousand dollars damages for their infringement of the Spear claim. Having satisfied themselves of the rights of Mr. Spear in relation to these inventions they seem determined to invoke the strong arm of the law to enforce them. We understand that all the stove concerns in Troy acquiesce in their decision, and the truth and value of the Spear and Smith claims. We shall endeavor to keep the trade posted as to the proceedings in the above matter, and we hope that the litigation which seems so strongly featured and shadowed by these proceedings against the infringers may result in a proper award by judicial investigation to Smith and Spear, whom it seems in the matter are entitled to be called the "original Jacobs."

The association who have bought the Smith and Spear patents have employed our townsman, Esck Cowen, Esq., of the firm of Smith, Fursman & Cowen, in connection with E. Dickerson, Esq., of the firm of Dickerson & Beaman, of New York, as counsel to represent them in the coming controversy.

**Take Notice!**

We are indebted to our friend Mr. Clement Olhaber, of Cincinnati, for a copy of a notice which he assures us was posted by the roadside in Campbell county, Ky. Mr. Olhaber is an inveterate wag, but as he shows us the hole in the paper made by the carpet tack which fastened it to the fence post, there can, of course, be no question as to the genuineness of the document:

**NOTICE.**

Know kow is allowed in these meddles, any men or women letten that kows run the rode, wot gits inter my meddles aforesaid shal have his tale cut off by me.

ORADIAH ROGERS.

The little talking machine which was on exhibition in New York a few years ago is now sputtering in Paris. An English paper, *Iron*, suggests a method of utilizing it. It says that the instrument would be invaluable at railway stations where porters roar out the name of the place in tones equally loud and unintelligible.

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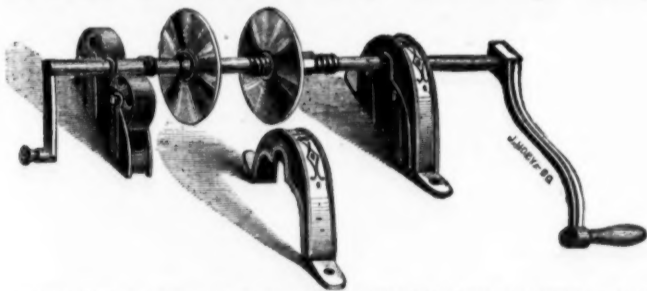
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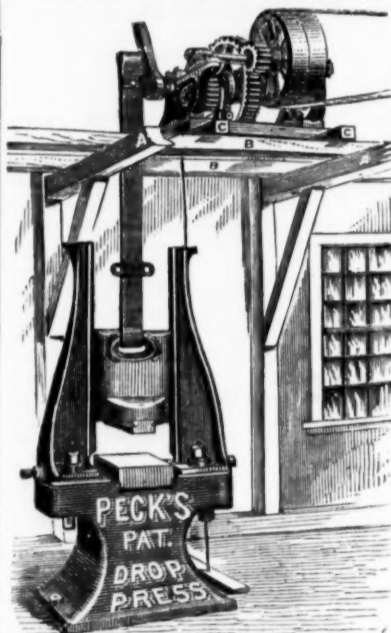
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WHY THE BEST:

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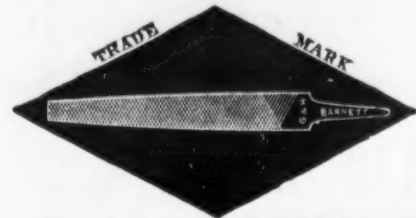
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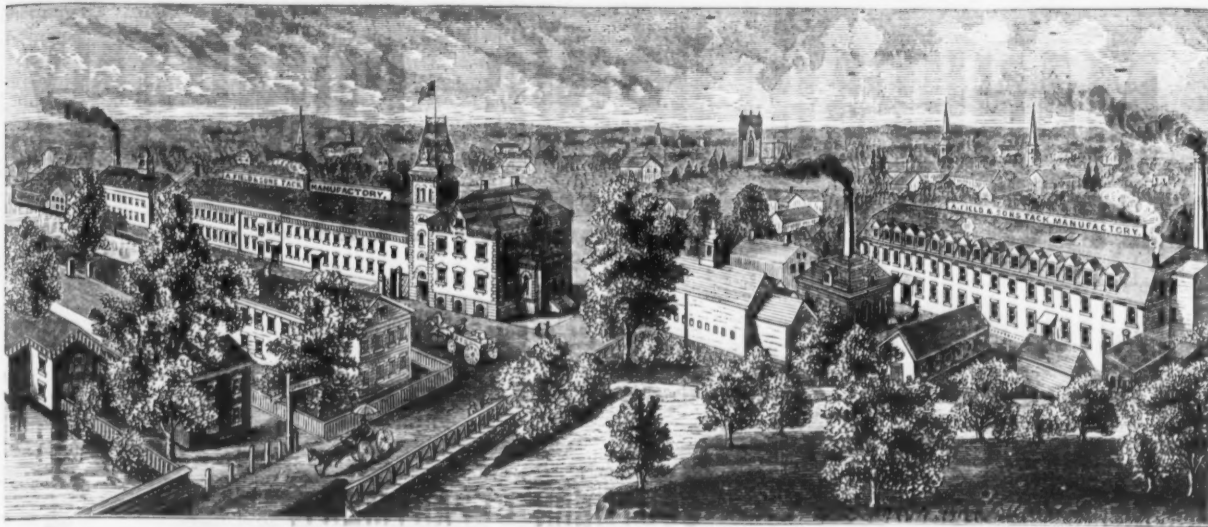
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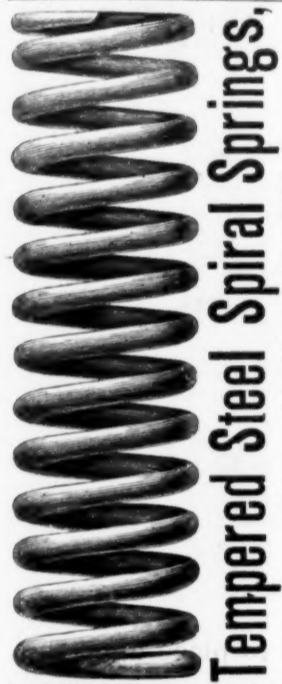
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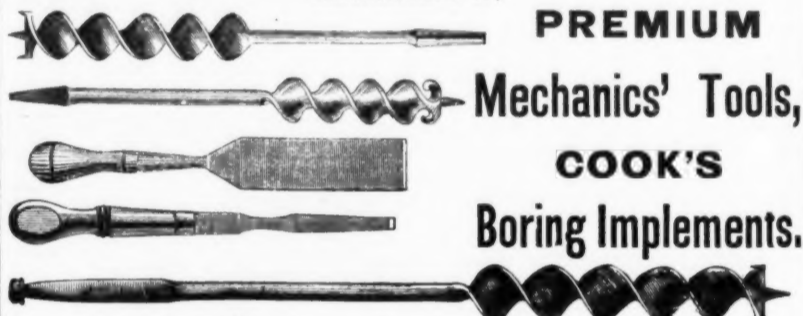
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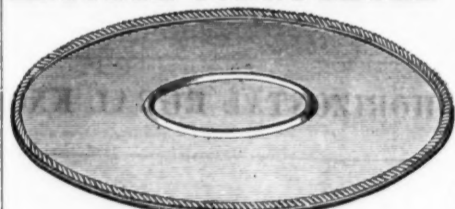


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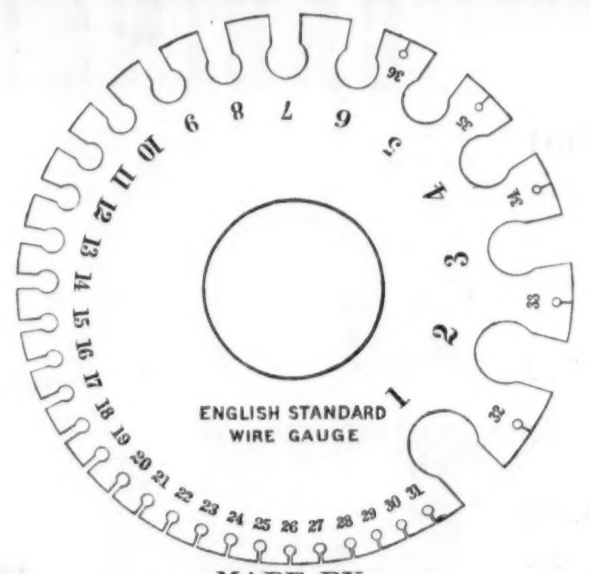


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The Ansonia Corrugated Stove Platform, with its heavy figured edge border, is believed to be the best Platform offered to the trade. As shown in the illustrated section herewith it requires no nailing to keep it in place or to prevent it from turning up at the edge; while the metal is of sufficient thickness to require no lining.

The low price, superior quality and fine finish of this Platform will be readily acknowledged. Packed 100 in a case. Send for price list.

## English Standard Wire Gauges



ENGLISH STANDARD  
WIRE GAUGE

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### INDUSTRIAL ITEMS.

MASSACHUSETTS.

The nail factories in East Weymouth, in which business has been suspended during the summer, owing to the inadequate supply of water, have now resumed operations on full time.

Fifteen thousand rifles were manufactured at the Springfield Arsenal last year.

The John Russell Cutlery Company, of Turners Falls, find their experiment of making pocket knives very successful, having already turned out 50,000 dozen, and being unable to fill their orders without enlarging that department of their works, which they are likely soon to do.

Owing to the general dullness of business, the Haydenville brass shops are running on short time, and the help have been cut-down.

The committee of Connecticut capitalists, headed by Gov. Jewell, who recently visited the Florence Sewing Machine Works, by request of the stockholders, have reported a plan for reorganizing the company, which reduces its capital, nominally \$500,000, to \$250,000, and the value of the present shares 90 per cent., so that the stockholders will own \$50,000 of the new stock, leaving the remainder to be made up by new subscriptions. The local paper claims that Mr. W. B. Hale will retire from the management of the company, in favor of S. L. Clark, of Hartford, and lately of the Weed Machine Company's Works.

The stockholders who own the buildings formerly occupied by the Sheffield Steel and Iron Works, Northampton, have voted to lease and sell their buildings, upon certain conditions, to S. R. Hinkley, who stands ready to start the foundries at once.

CONNECTICUT.

The Wheeler & Wilson Factory resumed work on Monday, the 23d inst.

The Union Metallic Cartridge Company, of Bridgeport, are fitting up the tap and die shop, West Stratford, for the extension of their business.

Seven hundred men and 400 girls are employed in the Winchester Armory. Work is prosecuted 23 hours out of 24, two sets of hands being employed. Thirty million cartridges have been manufactured during the past three months, and as many more will be made during the next three.

The New England Pin Company, of Winsted, have recently bought out a small pin factory at Cohoes, N. Y., and another in Canada, transferring their machinery to Winsted, and increasing its own capacity to 108 machines, capable of turning out 38,880,000 pins per week.

The Union Nut Company, of Unionville, were obliged to obtain a steam engine, the scarcity of water preventing them from keeping up with their orders.

The Southampton Cutlery Company did a good business all through last year, declaring quarterly dividends and increasing the company's surplus to an amount equal to the dividends.

A meeting of the creditors of the Birmingham Shovel Company will be held in New Haven on January 22.

The Strong Manufacturing Company, of Winsted, have put in a 24 horse-power engine, and is working steadily.

Briggs' Waterbury Screw Capping Company is to be removed to Ansonia and enlarged, and the Osborne & Cheeseman Company, of Ansonia, are to add to their business the manufacture of brass and copper tubing for chandeliers, etc.

NEW YORK.

It is rumored that steam street cars are to be placed on the Troy and Cohoes Railroad. The Albany and West Troy Street Railroad Company are also discussing the project of substituting steam for horse-power, and have ordered a specimen car from Gilbert, Bush & Co. to run between West Troy and Albany.

Some of the mills at North Adams are running on half time, because of the low water, and others are obliged to rely almost wholly upon steam power.

The statement of the Troy Co-operative Foundry Company, for the year ending January 1, shows an undivided surplus of \$21,383.92.

Work was suspended at the Bessemer Steel Works, at Troy, on the 19th, on account of the breaking of the bed plate of the engine. Work was resumed on Monday, the 20th inst.

NEW JERSEY.

Only three pits out of 15 are now running in the Warren Foundry, Phillipsburg. This large concern has a capacity of smelting 100 tons of pig iron per day.

It is reported that all the property and machinery of the Marlon Watch Company will be sold at auction for the bondholders. There appears to be little or no probability of the workmen ever receiving anything of the \$15,000 due them for wages.

PENNSYLVANIA.

Messrs. P. L. Kimberly and F. H. Buhl, representing two of the best and most successful iron mills in Pennsylvania, viz.: Kimberly, Carnes & Co., and Western Iron Company, both of Sharon, started on Saturday, the 13th inst., on a business trip to New Orleans. They are looking after a large contract, soon to be let by the American Cotton Tie Company, for hoop iron.

Ninety to a hundred boiler makers have been engaged to work three or four months at the Harrisburg Foundry and Machine Works, in making iron oil tanks.

The Pottstown Car Works will be in full operation again in a short time.

The rolling mills at Catasauqua and Fern Dale are not pressed with orders, and could do three times their present work.

The large bed plate upon which the new blowing engine will be placed at the Reading Pipe Works, of Mellett & Co., has been received from Welmer's Works, Lebanon. It is 8x6 feet and weighs several tons.

The Tamaqua Rolling Mill resumed operations last Monday.

Ore is being shipped from Spang & Kauffman's wharf, at Evansville, to the Keystone Furnace Company, at Reading, and to Wm. M. Kauffman & Co., at Sheridan.

The Bloom Furnace made 8648 net tons of pig iron in 1876, and is still in blast with no stock on hand.

The Marshall Furnace, Newport, blew out on the 28th ultimo, and will remain out until the times are better.

Mr. Bernhard Lauth, recently rolled three tons of 3/4 inch hoops in two hours and a half, on his new hoop machine. This is a day's work in the old way.

The Scranton Bessemer Steel Works resumed operations on the 9th inst.

The forge at Knauertown, Chester county, went into operation on the 9th inst.

Quite a number of the machinists and blacksmiths at the Scott Works, Reading, were discharged on the 13th inst. On the first of the year a deduction from 15 to 25 per cent. was made on the wages of all employees. The work on hand at this establishment is nearly all completed, and orders for new work are coming in very slowly.

The rolling mill of Potts Brothers, at Pottstown, resumed operations on the night of the 16th.

The Philadelphia and Reading Coal and Iron Company are apparently preparing for an extensive business this season. At the West Shenandoah Colliery, which has been shut down for the winter, 50 men and boys have been put to work driving gangways, turning breasts, &c.

Henry Fulmer, the late purchaser of the Keystone Furnace, Keystone, intends putting it in blast as soon as possible, and is laying in a large stock of ore. The starting of this furnace will give employment to a large number of men.

The Thomas Iron Co., who purchased the Thoma & Blanda Steel Works, have workmen engaged in taking apart the engine and other machinery in the said works, and are removing the parts to Hokendauqua.

Philadelphia and Erie employees, at Renova, are working ten hours a day.

The coke ovens in Dawson are in full blast, and turn out from 60 to 70 cars daily.

An accident happened at the Crowther Furnace, Newcastle, on Thursday afternoon, the 11th inst. The lining of the stack fell in, causing damage to the amount of about \$1500. Repairs are now being made, but the furnace will not probably resume operations before spring.

Wm. Tod & Co. are the new firm that succeeds Homer Hamilton & Co. as proprietors of the foundry and machine shops, at Youngstown. The present proprietors are Wm. Tod, John Stambaugh and Mrs. Margaret Gerwig.

A correspondent writes to the Sharon Herald as follows concerning the rumor that the Wheatland Rolling Mill is about to resume operations: "Mr. Theodore Wood, a member of the old firm of James Wood, Sons & Co. has made the creditors another proposition (the terms of which we do not know), and it is the opinion of well informed men that the creditors will accept the terms this time. In January of 1875, 10 per cent. was paid to the creditors by the assignees. During the following fall, sometime during August or September, Mr. Wood proposed to pay the creditors 25 per cent. on the amount unpaid, making about 3 1/2% on the whole amount. The amount offered by Mr. Wood aggregated close to half a million dollars. This proposition was refused by the creditors, when a sale was ordered, and \$150,000 offered. The following January, at the appointed time, another sale came off. There were few moneyed men attended, and only \$100,000 was bid (about one-twentieth of the real value); of course that sum would not be considered, so the thing was postponed. So, with this fact in view, the creditors may not be so stiff now, but consider that something is better than nothing and accept Mr. Wood's offer."

The Easton Lock Works were sold at public sale Monday afternoon, the 15th inst., to Thos. S. Armstrong, for \$1000. It is the intention, we understand, of the purchaser to continue the manufacture of locks, and work will be resumed at the establishment at once.

The foundry and machine shops of Schaeffer, Merkel & Co., Fleetwood, are running day and night with a complement of men, a number of machinists from Reading and other places being employed in addition to the usual number. This firm has lately obtained the contract for a large amount of work. Several Philadelphia parties have ordered a number of stationary engines, roller crushers and Bradford ore separators, to be used at their zinc and lead mines in Illinois, Wisconsin and Missouri in crushing the quartz and separating the metals from all foreign matter. Between \$50,000 and \$100,000 worth of machinery has been ordered by these parties. About \$30,000 worth has already been manufactured and shipped to its place of destination.

Furnace No. 1, of Messrs. Seyfert, McManus & Co., proprietors of the Reading Iron Works, was blown in on the evening of the 17th, with good prospects of a fair trade. The first casting was made on the morning of the 18th.

The work is nearly finished of attaching coal dirt arresters to the stacks of the new boilers, in which steam is generated for driving the machinery in the shops of the Philadelphia and Reading Railroad Company.

The Pottstown bolt machine and planers of the railroad company have been brought to Reading. The former has been placed in the blacksmith shop and the latter in the machine shop.

J. M. Kaufman & Bro., of Auburn, expect to blow in their Jefferson Furnace the last of March, but only to use up stock on hand, unless times get better. It is a cold-blast charcoal furnace.

(Continued on page 11.)

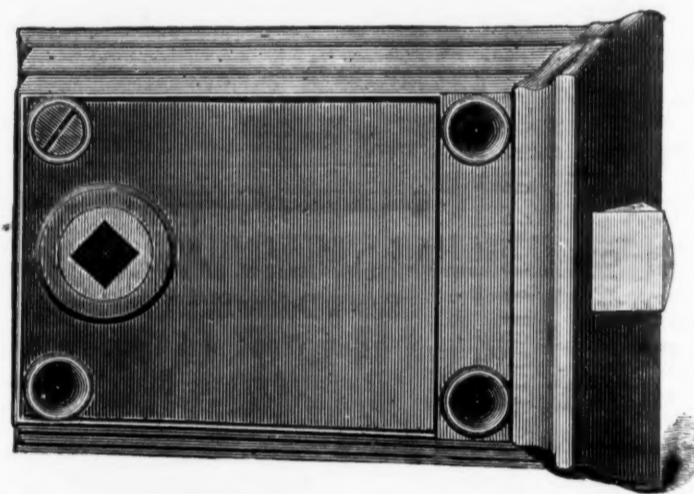
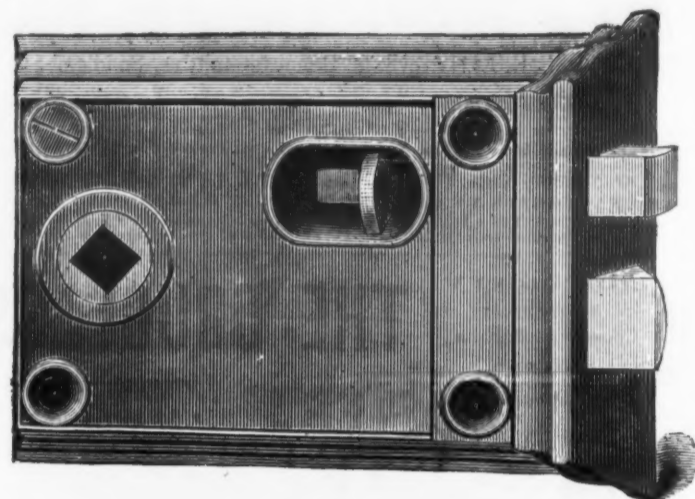
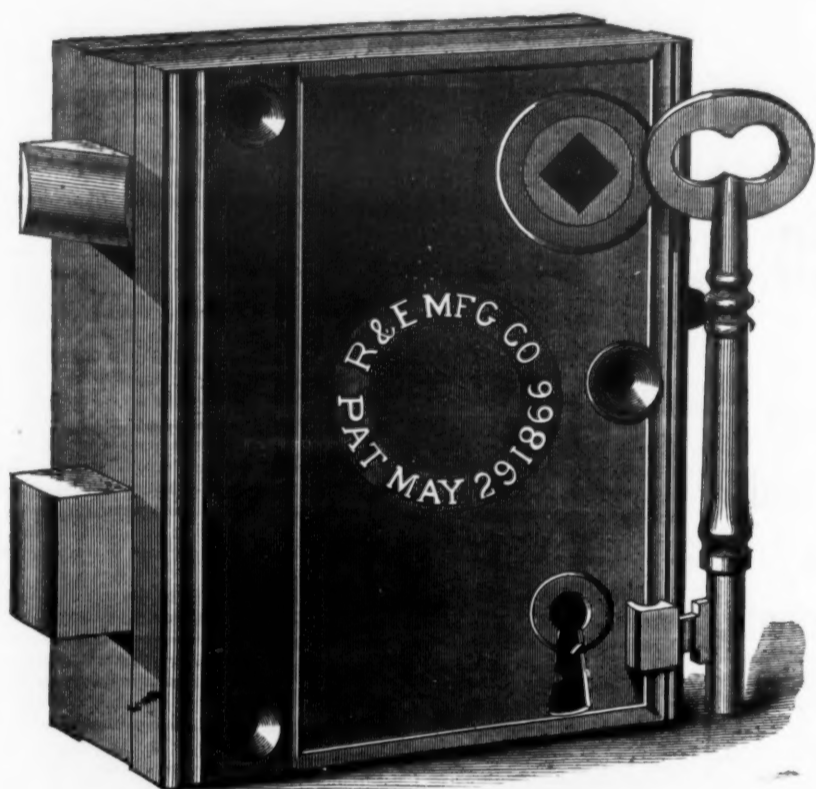
# RUSSELL & ERWIN MANUFACTURING COMPANY

## MANUFACTURERS OF HARDWARE.

Factories, NEW BRITAIN, CONNECTICUT, U. S. A.  
Manufacturers' Agents and Dealers in General Hardware at our  
**WAREHOUSES,**

NEW YORK, - - - Nos. 45 and 47 Chambers Street.  
PHILADELPHIA, - - - No. 425 Market Street.

SOUTHERN DEPARTMENT,  
BALTIMORE, MD., WM. H. COLE, AGENT, 17 South Charles St.



## NEW GOODS.

In consequence of the high prices established for Brass Bolt Rim Knob Locks and Latches, we have determined to place upon the market a new line of **BRASS-PLATED** goods, for which we solicit orders for immediate delivery. We shall increase our variety as occasion may require.

These goods are furnished with **BRASS-PLATED BOLTS** and **SOLID BRASS** Keys, and in make and finish are equal to our standard goods.

### HOME UPRIGHT RIM KNOB LOCKS. PULL-OUT REVERSE.

No.	Size.	Description	Without Knobs Per Dozen.
B 861	4 inch.	Janus face, 2 Brass-plated Bolts Solid, Brass Key, without Stop.	\$5.00
B 861½	4 inch.	" " " " " with Stop.	5.25

### HORIZONTAL RURAL KNOB LATCHES.

No.	Size.	Description	Without Knobs Per Dozen.
B 557	3½ inch.	Brass-plated Latch Bolt - - - - -	\$4.00
B 552	3½ inch.	" " and Slide Bolt - - - - -	5.00

Discounts, same as on our regular goods.

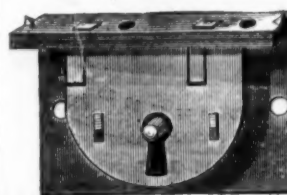
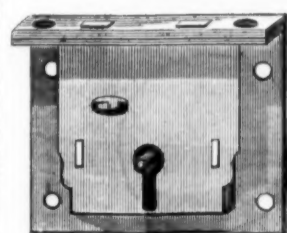
## SCREWS.

We are now producing over 6000 gross per day of **Flat Head Gimlet Point Screws** of **Quality** and **Finish** which we **GUARANTEE** to be **Superior** to that of any other Screws manufactured in the **WORLD**, and we invite a comparison under the **Severest Tests**.

Our prices will at all times be as low as those of any standard manufactures, and we solicit letters of inquiry for quotations before orders are given elsewhere.

Our Screws are all packed in our new Patent Paper Boxes bearing our labels on which are **Large Figures** denoting the **Size** and **Number**.

## CABINET LOCKS.



Our assortment of these goods is complete, and we can also supply a full line of "Eagle" and "Gaylord" Locks at manufacturers' prices. An **Illustrated Catalogue** will be issued at an early date. Parties can meanwhile order by either Eagle or Gaylord numbers.

## Cutlery.

## FRIEDMANN &amp; LAUTERJUNG,

Manufacturers of PEN AND POCKET CUTLERY.

Solid Steel Scissors, Shears, Razors,  
Russia Leather Strops, Hones, &c.

Sole proprietors of the renowned full concave patent

**"ELECTRIC RAZORS,"**And the celebrated **"ELECTRIC SHEARS."** Nickel Plated  
Hones.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &amp;c.

91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

MERIDEN CUTLERY CO.

Received the HIGHEST CENTENNIAL PRIZE.



MANUFACTURE ALL KINDS OF TABLE CUTLERY.

Exclusive Makers of the "PATENT IVORY" or Celluloid Knife, the most durable WHITE HANDLE  
known. The Oldest Manufacturers in America. Original Makers of the HARD RUBBER HANDLE.  
Always call for "Trade Mark" "MERIDEN CUTLERY CO." on the blade. Warranted and sold by all Dealers  
in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers Street, New York.

THE MILLER BROTHERS CUTLERY CO.,

Manufacturers of

PATENT FINE PEN &amp; POCKET CUTLERY

WEST MERIDEN, CONN.

The only Knives made that are put together in such a manner that there is no strain on the cover-  
ing or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any  
made, and are acknowledged by English makers as the Best American Knife. We also make

NICKEL &amp; SILVER PLATED POCKET KNIVES

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal  
to any other knife. Orders filled from the factory, and in New York by Messrs. J. Clark Wilson  
& Co., No. 81 Beekman Street (who have a full stock of all patterns always on hand), and also by  
Messrs. G. B. Walbridge & Co., No. 99 Chambers Street.

NAUGATUCK CUTLERY CO.,

Manufacturers of FINE PEN &amp; POCKET CUTLERY.

FULLER BROS., Sole Agents, 89 Chambers and 71 Reade Sts., N. Y.

## HALL, ELTON &amp; CO.,

Electro Plated Ware, German Silver and Britannia Spoons.



THE "PALACE."

Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm &amp; Son,

"Limited."

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &amp;c.

AGENT FOR

WALTER SPENCER &amp; CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark.

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ROTHERHAM

Granted 1777.

VAN WART, SON &amp; CO.

Hardware Commission Merchants,

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BIRMINGHAM, - ENGLAND.

Agents.

McCOY &amp; COMPANY,

184 &amp; 186 Duane Street, N. Y.

George H. Gray &amp; Danforth,

18 India Street, Boston.

F. W. TILTON.

At each of these places a complete assortment of sam-  
ples of Hardware and Fancy Goods will be found, in-  
cluding all new descriptions. Sole Agents for

John Rimmer &amp; Son's Celebrated

Harness and other Needles.

W. Clark's Genuine Horse Clippers.

Seydel's "Ashantee" Pocket Hammer

McCOY &amp; COMPANY,

BORAX A SPECIALTY,

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OR

HARDWARE, CUTLERY, GUNS, &amp;c.

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Joseph Rodgers &amp; Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. &amp; W. CLATWORTHY, Agents.

The demand for Joseph Rodgers &amp; Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of Joseph Rodgers &amp; Sons' Manufacture, please to see that they bear their Corporate Mark.

OWEN &amp; CAMPBELL,

Manufacturers of

PEN AND POCKET

CUTLERY.

All blades forged from the best English Cast Steel, and warranted. Each knife made in the most substantial and compact manner, all articles used being of the best quality. All blades stamped Owen &amp; Campbell, Philadelphia.

Orders filled from the Factory Rear of

230 N. Second St., PHILADELPHIA.

Send for catalogue. Manufactured by

## Cutlery.

ESTABLISHED 1853.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

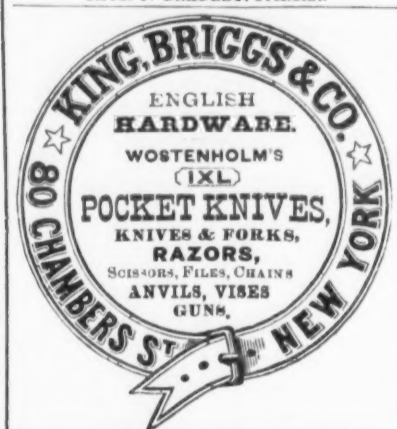
Table &amp; Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.



Young's Patent Folding Scissors.



These Scissors are made of the very best steel, nickel plated, and so constructed that they can be readily folded and carried in the pocket without injury to the garments. A sample pair will be sent by mail, to the trade only, upon receipt of the retail price, namely: For small size, either blunt or pointed, \$1.00. Large size, pointed or half pointed, \$1.50. New York, Feb. 1st, 1876.

MARX BROS., Proprietors, 430 Broadway.

AMERICAN

PEN AND POCKET KNIVES,

MANUFACTURED BY

AARON BURKINSHAW, PEPPERELL, MASSACHUSETTS

My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society, also a 1st and 2nd Diplomas from the Mass. Mechanics' Ass'n Sept. 1, 1874.

Established 1853.

AMERICAN SHEAR CO.

Manufacturers of

Pen and Pocket Cutlery,

Shears, Scissors and Pruning Shears,

HOTCHKISSVILLE, CONN.

Salesroom, 298 Broadway, New York, with

LANDERS, FRARY &amp; CLARK.

(Continued from page 9.)  
INDUSTRIAL ITEMS.

## PENNSYLVANIA.

Lowry &amp; Eichelberger have been running both the forge and furnace, at Barre Forge, under a lease since June, 1876. All the metal made at the furnace is worked up in the forge. The Packerton Car Shops built 3900 cars last year.

The Pencoed Iron Works, Philadelphia (A. &amp; P. Roberts), are running to their full capacity, having some important contracts on hand, among which we name 4000 axles for the Pennsylvania Trust Co. and a large quantity of bridge iron, &amp;c.

## PITTSBURGH AND VICINITY.

A secret session of the Wrought Iron Pipe Manufacturers' Association was held in the Monongahela House on last Wednesday. Another session was held on last Thursday.

The Superior Rail Mill, which has long been lying idle, has, it is said, been purchased by a party of Eastern capitalists, who intend to convert it into a Bessemer steel works.

Messrs. Wm. Clark &amp; Co. announce that they will give 300 bushels of coal per week to the poor of Lawrenceville.

The muck rollers at Wm. Clark &amp; Co.'s Hoop Mill were reduced 6 cents per ton on Monday, the 13th inst.

The Tin Plate Works, at McKeesport, have resumed operations.

On Thursday night, in 11½ hours, there were turned out 600 rails, each 30 feet long, at the Edgar Thomson Steel Works.

## NEW JERSEY.

William J. Taylor has leased the furnace belonging to the Port Oram Iron Co., at Port Oram. The furnace was put in blast some ten days ago and is working very satisfactorily.

## WEST VIRGINIA.

The South Wheeling Glass Works resumed operations on Monday, the 22d inst.

A vein of hematite iron ore from 3 to 3½ feet thick was found a few days ago on the farm belonging jointly to Wm. Exley and George Crumbacker, on Chapline Hill, near Wheeling. At the same time rich veins of coal were discovered on the property. The ore was analyzed by Charles Dwight, and found to contain 34 per cent. of iron. It is intended to develop the ore as soon as the weather will permit.

The Belmont Nail Works Co.'s nailers and heaters were at work on the 19th, after a stop of about six weeks.

The new engine of the Benwood Mill, of Wheeling, will have a trial run in a few days in the presence of the stockholders and others interested.

## NORTH CAROLINA.

Every blast furnace in this State is out of blast, and there is very little prospect that most of them will blow. The product will not bear shipping and the local trade is limited.

The Madison Furnace, J. W. Derr, proprietor, Lincoln, Lincoln county, will run for two or three months the present year to supply the local demand.

The Rehoboth Furnace, at Iron Station, will run to work up stock.

The Buckhorn Furnace, Lockville, made 400 tons of iron in 1876.

## OHIO.

On the 5th inst. notices were posted up in the Cleveland Rolling Mill Company's Works to the effect that the mills would stop on the 20th inst.; also, owing to the depressed state of business, a reduction of from 13 to 15 per cent. would be made after the above date.

Mr. J. H. Roads bought in the Portsmouth Agricultural Works at the sale on the 16th inst.

The Gaylord Rolling Mill, Portsmouth, suspended operations two weeks ago for want of pig metal, the closed river preventing purchases arriving there.

The Lake Erie Iron Company, Cleveland, are working a force of 120 men on stock.

The mill of the Standard Iron Company, at Cleveland, has been closed for a short time to permit the taking of the annual account of stock. The galvanized iron shop has been shut down for a short period.

Forty-five men are now employed at the shops of Miller, Jamieson &amp; Co., Cleveland.

The Novelty Iron Works Company, of Cleveland, had an excellent business year in 1876, and are now operating quietly preparatory for the receiving of profitable orders for 1877. A 10½ ton roll for use at one of the rolling mills of the city is being fitted up at their shop, and a number of the patent hose reels are being constructed there.

The Tod Brier Hill Furnace has blown in.

The Grafton Furnace, at Leetonia, will shut down about Feb. 1.

Clinton Furnace lands are again offered for sale by the sheriff of Scioto county, the sale to take place on the 5th prox., at Portsmouth.

Brown, Bonnell &amp; Co., Youngstown, recently made a large shipment of nails to Canada.

The Falls Rivet Company, the Falls Wire Company, the Taylor Wire Cloth Company and other manufacturing firms of Cuyahoga Falls, are doing a good business.

Two new boilers, 60 feet in length, are being made at W. B. Pollock's Boiler Works, Youngstown, for Andrews &amp; Hitchcock, to be added to the battery at their Hubbard furnaces.

On Friday, the 22d ult., the Jefferson Iron Works, Steubenville, ceased operations for a month or six weeks, in accordance with the usual custom of the company. Between 500 and 600 hands are employed at this establishment, the product of which is nails.

The Acme Glass Works, at Steubenville, are about resuming operations.

The Glass Works at Martin's Ferry, after a rest of one week, have started up again in full blast.

The Wire Mills, at Cleveland, started up again double turn on Monday, the 22d inst.

The Iron and Steel Furnace, Ironton, has

blown out for want of coke, and Sheridan only six miles up the river!

The Buckhorn Furnace is out of blast, having stopped up for two or three weeks, but will go into blast soon.

The Lawrence Iron Works, Ironton, elected the following directors: Cyrus Ellison, Jas. Thomas, George T. Scott, Evan Williams, W. L. Keepers—the latter taking the place of John Ellison, deceased. All the stockholders are directors now.

The Aetna Iron Works elected as follows: Geo. Willard, Cyrus Ellison, W. C. Amos, Dr. McGovney, A. T. Dempsey, E. Bixby and W. H. Enoch—the latter taking the place of John Ellison, deceased. The directors organized by choosing Geo. Willard, president; E. Bixby, vice-president; and Geo. K. Hosford, secretary.

The Belfont Iron Works Co., Ironton, at the last directors' meeting made a cash dividend of 5 per cent.

The Iron and Steel Mill, Ironton, commenced running again Monday, the 15th inst.

## MISSOURI.

The blast furnaces of Missouri are pretty well silenced by the depression in the iron trade, there being but six in blast out of a total of 23.

## MICHIGAN.

The Morgan Furnace will blow out this week.

The Champion Iron Co. have in contemplation the purchase of new and elaborate engines and hoisting machinery, which will be more powerful than any now in use in the district.

The two furnaces belonging to the Jackson Iron Co., situated at Fayette, were considerably damaged by fire on the 22d ult. One account says an explosion occurred in No. 2 stack, and another says one of the arches gave out. It is stated that the damage amounts to from \$35,000 to \$50,000, and is principally confined to the No. 2 stack, the hoist and loss of buildings. The No. 1 stack was likewise damaged to a considerable extent. It is the opinion of Captain Merry, the agent of the company in that city, that the furnaces will be rebuilt and put in working order as soon as possible.

The following table, from the Marquette Mining Journal, shows the output of ore by each mine during the year 1876, including ore to local furnaces:

Name of Mine.	Gross Tons.
Jackson	78,879
New York	59,229
Cleveland	145,961
Republic	120,094
Lake Superior	111,766
Saginaw	56,579
Champion	56,022
Michigan	70,007
Barren	37,632
Rolling Mill	53,265
Lake Angeline	22,339
Valley	20,315
Edwards	19,330
Spurr Mountain	20,376
Winthrop	27,236
Palm	17,278
McComber	15,324
Keystone	7,715
Cambria	6,329
Bessemer	4,779
Shearwater	5,596
Humbolt	3,433
Excelsior	2,857
Wheeler	2,022
Erie	1,068
Nelson & Curry	732
Foster	230
Smith	225
Grand Central	456
Total	977,232

\*Does not include product of Pioneer Mine, from which we have no report.

Against a total of 910,840 gross tons in 1875, and showing an increase of 66,392 tons. The aggregate value of this output, on the cars at the mine, was in round numbers, \$4,150,000.

## KENTUCKY.

The shipments of iron ore from Carter county to Hunnewell furnace during last year were:

Pactolus ore	653 38 tons.
Vincent ore	195 31 "
Reedville ore	644 05 "
Grayson ore	3729 76 "
Total	5844 56 "

Bellefonte Furnace will blow out in a few days.

Hunnewell Furnace will not finish her repairs and go in blast before the end of the month.

Charlotte Furnace is out of blast.

## INDIANA.

Kerrick &amp; Winegardner, of Indianapolis, are shipping a large quantity of machinery South and to the Pacific states. They report business improving.

The Terre Haute Iron and Nail Co. were stopped for two weeks, but started up on Monday, the 22d inst.

## WISCONSIN.

Rumors reach us that the Milwaukee Iron Co. are to put a force of miners at work on the Breen Mine immediately, with the expectation of having several thousand tons of ore ready for shipment as soon as the railroad is prepared to transport it.—Menominee Herald.

An important point in commercial law has come up, which may be stated as follows: Charles B. Wood sued the Erie Railway Company for damages to a carriage sent on one of its cars, and was non-suited because he was doing business under the name of "Woods Bros.," contrary to the statute, there being no partner. He appealed, and the General Term reverses the decision, holding that the bill making the carriage deliverable to the carriage warehouse company meant a contract to deliver it to the party entitled to it, who was in fact the plaintiff. A new trial is ordered.

The Carron Iron Company, Scotland, have decided upon extensive alterations and improvements in their works, which, if carried out as at present contemplated, will cost £100,000. Additional space will be secured for workshops on a settled plan, in lieu of the present scattered and dilapidated buildings. The company intend to introduce into the new shops vertical punching machines and other appliances.

**PEACE & HOGAN, VULCAN SAW WORKS.**  
Manufacturers of every kind of  
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Report: "Being of very Superior Quality and of great Practical Utility."  
J. D. IMBODEN, of Virginia, CHARLES STAPLES, of Maine, G. L. REED, of Penn.,  
J. DIFENBACH, of Germany, DAVID MCHARDY, of Scotland, D. STEINMETZ, of Phila. Judges.  
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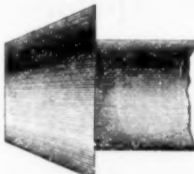
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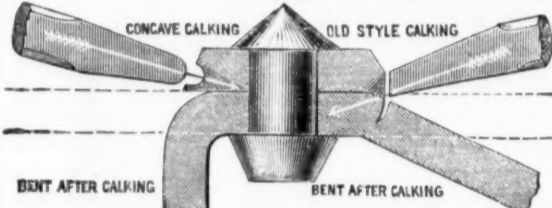
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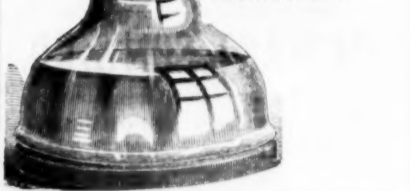
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**First Page.**—A Practical Electro-Plating Plant? An Improvement in Cut Nails. Metric System—The Other Side. Importance of Studying Natural Philosophy.  
**Third Page.**—New Patents. A Note on Fife-Blackwell's Island Bridge.  
**Fifth Page.**—The Ashtabula Bridge.  
**Sixth Page.**—Scientific and Technical Notes. The Anti-Clinker Grate Locomotive. Take Notice!  
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**Thirty-first Page.**—New York Wholesale Prices.—(Continued).  
**Thirty-fifth Page.**—Philadelphia, Buffalo, Cincinnati, Pittsburgh and Detroit Hardware and Metal Prices.  
**Thirty-ninth Page.**—Chicago, Boston, and St. Louis Hardware and Metal Prices.

### The Condition of the Blast Furnace Industry of the Country.

We give in another column a table, compiled from original returns, showing in detail the condition of the blast furnaces of the country on the first of January, 1877. The table is very complete, the furnaces of Texas and Utah, three in number, being the only ones not heard from, and these are probably out of blast; but this is immaterial, as they are so small they affect the aggregate but little.

To avoid any possible misunderstanding,

ings, we again make the following explanations as to the tables:

1st. The divisions of localities are geographical for the most part, and are not made with reference to the points from which furnace supplies are drawn. 2d. The columns "in blast" and "out of blast" only show the stacks from which we have reports, and their footings will not equal the footings of the column of total number. 3d. We have included some furnaces that are rebuilding and not yet completed, and in one or two cases some furnaces that have been reported abandoned, as their owners do not so report them. 4th. The column of capacity per week is much in excess of what the regular working of the furnaces will show—stoppages, slow working and various other causes which will readily occur to those interested, combining to reduce the make below the furnace capacity.

For the purpose of comparison we give below tables showing the condition of the furnaces at corresponding dates of 1874, 1875, 1876, 1877:

	<i>In Blast.</i>			
	1874.	1875.	1876.	1877.
Charcoal.....	152	95	95	73
Anthracite.....	130	100	100	87
Bituminous.....	81	98	98	84
Total.....	410	393	293	244
	<i>Out of Blast.</i>			
	1874.	1875.	1876.	1877.
Charcoal.....	145	186	209	209
Anthracite.....	87	136	136	136
Bituminous.....	96	109	129	123
Total.....	328	430	474	468

We have on previous occasions, when publishing these tables, called attention to the fact that they showed less of a decrease in the bituminous furnaces than in either anthracite or charcoal. To make this more evident we give the following table of percentages of entire number reported in and out of blast:

	In Blast.			
	1874.	1875.	1876.	1877.
Charcoal.....	51	34	26	
Anthracite.....	60	40	39	
Bituminous.....	46	47	41	
Total.....	62	52	41	34

	Out of Blast.			
	1874.	1875.	1876.	1877.
Charcoal.....	40	66	74	
Anthracite.....	40	60	61	
Bituminous.....	54	53	59	
Total.....	38	48	59	66

Out of Blast.

	1874.	1875.	1876.	1877.
Charcoal.....	40	66	61	74
Anthracite.....	40	60	61	61
Bituminous.....	54	53	59	59
<b>Total.....</b>	<b>88</b>	<b>48</b>	<b>59</b>	<b>66</b>

While the decrease in the number of charcoal furnaces in blast has been one-half and of anthracite one-third from 1875 to 1877, the decrease in bituminous furnaces has been one-ninth. There are a number of reasons for this. In the first place, the conditions of the bituminous furnaces, especially the financial, were such that a larger portion of them more readily succumbed to the panic. This portion of the blast furnace industry is of comparatively recent date. Many of the individuals and firms owning coke furnaces had but little experience in the practical details of making pig iron, and in many instances their capital was in keeping with their experience. The heavy risks and the extravagances of ignorance could be borne when iron was \$50 a ton and capital plenty at high rates, but when the crash came and economy, close management and capital were needed for successful working, they were wanting and inevitable ruin overtook them. In other cases, however, owners of furnaces of ample means and large and successful experience deliberately blew out their furnaces, declaring that they could not and would not make iron at the ruling prices. This is the position assumed by some of the best iron masters of the Shenango Valley, notably those at Sharpsville.

But there is another reason that is patent to those who have watched the course of trade, and that is that for the past two years especially, not only has the relative consumption of Western-made merchant iron been constantly on the increase, but the proportion of bituminous iron used in its manufacture.

For proof of the latter fact we need only refer to the tables published in a previous issue, showing the decline in the shipments of anthracite irons West, and also to the fact that for many uses in the rolling mill, for which charcoal irons were formerly regarded as indispensable, coke irons are now not only used but preferred.

The truth of the former statement, viz., that the consumption of Western-made merchant iron has been on the increase, is best shown by the following tables:

	1874.	1875.	1876.	1877.
<b>Number of Kegs of Nails made in States using Bituminous Pig Iron in the years 1873-1875.</b>				
West Virginia.....	878,653	1,084,027	1,038,772	
Kentucky.....	104,411	104,411	143,473	
Ohio.....	460,618	545,052	592,768	
Indiana.....	98,530	130,219	182,988	
Illinois.....	83,500	85,000	88,561	
<b>Totals.....</b>	<b>1,621,501</b>	<b>1,966,709</b>	<b>2,048,562</b>	
<b>Totals, U. S.....</b>	<b>4,024,704</b>	<b>4,912,180</b>	<b>4,726,881</b>	
<b>Percentage of whole made of bituminous iron.....</b>	<b>36%</b>	<b>40</b>	<b>43</b>	
<b>Tons of Merchant Iron made in States using Bituminous Pig Iron in the years 1873-1875.</b>				
West Virginia.....	3,963	1,609	2,105	
Kentucky.....	26,569	23,359	30,936	
Ohio.....	118,709	110,536	116,178	
Indiana.....	4,500	7,376	11,465	
Illinois.....	5,240	4,740	8,000	
Michigan.....	4,109	5,760	3,450	
Wisconsin.....	8,601	275	14,437	
Missouri.....		12,370	14,144	
<b>Totals.....</b>	<b>171,591</b>	<b>166,045</b>	<b>190,715</b>	
<b>Totals, U. S.....</b>	<b>875,133</b>	<b>864,538</b>	<b>961,594</b>	

We do not include Pittsburgh and the Shenango Valley in the above table, though the iron in these regions is almost entirely from bituminous pig iron, as we have no figures of make in these sections separate from those of the balance of the State of Pennsylvania. If we had the showing would be still better. Pittsburgh alone makes nearly if not quite half of the rolled iron, inclusive of rails, made in Pennsylvania; and with the Shenango Valley added, the aggregate of bituminous made iron would be largely increased. It will also be seen that we have not included any states but those which use coke irons almost entirely.

Another item to be noted is that the only important increase in the number of furnaces during these years is in the coke furnaces. Taking the number of stacks, as given in the table, we have the following:

	1875.	1876.	1877.
Charcoal.....	297	241	282
Anthracite.....	217	225	223
Bituminous.....	177	197	197

While new charcoal and anthracite furnaces have been built and enough old ones have been abandoned to prevent increase in number.

We again call attention to the fact, as shown in the table, that the capacity of furnaces in blast is greater than those out of blast. This is especially noticeable in the case of the bituminous furnaces, 84 furnaces in blast having only about ten per cent. less capacity than 123 out of blast, or nearly fifty per cent. more.

A comparison of the table here given with the one published in our issue of Sept. 28, 1876, will show that in the interim a number of anthracite and bituminous furnaces have gone in blast, while charcoal furnaces have blown out.

	In Blast.	Out of Blast.
Sept. 1, 1876.	1877.	1877.
Charcoal.....	70	58
Anthracite.....	70	87
Bituminous.....	76	84

We have omitted from the reports of the charcoal furnaces for Jan. 1, 1877, in the above, showing the Pennsylvania and Tennessee furnaces, which were omitted in the September report.

No reference can be drawn from the increase in charcoal furnaces out of blast as it is customary in some regions to go out by the first of the year; a charcoal furnace rarely making a consecutive blast of a year. On the other hand, the blowing in of anthracite and coke furnaces has a significance. It indicates either that the stocks are getting low and that there is a prospective demand for iron at somewhat higher prices, or else that the decline in the price of labor and materials, with the exercise of closer economy, has reduced the cost of manufacture materially.

As to stocks, we are gathering information that will be incorporated in a subsequent article. This is to-day one of the most important subjects connected with the blast furnace industry, and we are getting information not only as to stocks unsold but also in hands of consumers.

### The Brooklyn Bridge Wire.

As stated in our issue of last week, the contract for the Brooklyn Bridge wire has, after a series of tests, been awarded to Mr. J. Lloyd Haigh, New York. The material used will be crucible steel, furnished by Mr. A. B. Parker, the New York agent of Anderson & Passavant, of Pittsburgh. This firm is the successor of the older firm of Anderson & Woods. The weight of the rods are from 75 to 90 pounds, which gives some 1000 or 1050 feet per coil of wire. These lengths and weights of rod are greater than those called for by the specifications, and a considerable advantage will result therefrom. The tempering is to be done by the hot-air process in the coil, instead of continuously, as was supposed necessary at first. At the suggestion of the manufacturer, the tests are to be made a little more rigid by taking test pieces from both ends of each coil, instead of from one. The award was finally made on the ground of the lowest price for best material presented, and not as our English friends supposed it would be, to some firm "in the ring." If we are not mistaken in the figures, only one of the foreign bidders offered wire at prices which, when duties and freight are deducted, would approach those of the best American bids.

The following are the names of the bidders and the prices offered:

	Gold.
1. W. T. Henley & Co., London: Kind of steel not stated; 6 1/2 d. sterling per pound, equal to 13 1/2 cts., deliverable here.....	\$90,800.00
An alternative bid at 230 per ton, free on board in London, including duties, but exclusive of freight, say, \$5 per ton, which would be \$17,000 in addition, and also insurance and other charges to be added.....	777,286.40
2. J. Lloyd Haigh, Brooklyn: Crucible cast steel (according to letter addressed to the president), at 8 7/10 cts. per pound.....	591,600.00

3. Cleveland Rolling Mill Co., Cleveland, Ohio: Kind of steel not stated, at 8 1/2 cts. per pound.....	561,000.00
4. Washburn & Moen Mfg. Co., Worcester, Mass.: Kind of steel not stated, at 13 95-100 cts. per pound.....	948,600.00
5. The John A. Roebling's Son's Co., Trenton, N. J. (two bids): 1. For crucible steel, sample marked O, at 9 cents per pound.....	612,000.00
2. Kind of steel not stated; sample marked R, at 6 1/2 cents per pound.....	459,000.00
6. Richard Johnson & Nephew, Manchester, England: Messrs. L. G. Tiltson & Co., 8 Dev street, N. Y., Agents: Kind of steel not stated, at 13 1/2 cts. per pound.....	918,000.00
7. Bocker & Company, Schalke, Westphalia: (Sulzbacher, Ryman, Wolf & Co., 46 Cliff street, N. Y., Agents.) In a letter of the agents accompanying the bid, it is stated that these manufacturers have a process of melting, only known to themselves, in making the article of cast steel; they propose at 9 1/2 cents per pound.....	671,500.00
8. Chrome Steel Company, Brooklyn: The same kind of steel as furnished by them for the ropes for the temporary bridge, namely, Chrome steel, at 11 1/2 cents per pound.....	807,500.00
9. Carey & Moen, of New York: Kind of steel not stated, at 13 cents per pound.....	884,000.00

In order to give the widest range to bidding, bids were received and iron tested of all kinds, no restrictions being made upon the material used, save that it should be of sufficient strength and uniformity to come up to the requirements. The standard called for demands that the wire shall be of a uniform medium quality—that is, it must be neither too hard or high in its character, nor too soft or low in its temper. In order to insure this uniform quality, it is necessary that all the cable wire shall undergo the operation of hardening and tempering. There are several methods known by which this is done, some controlled by patents, and others of a secret nature. Whatever the process pursued by the manufacturer, the inspector has to satisfy himself that every ring of wire has undergone the operation.

One of the English competitors sent samples which, with one exception, fell far below the required strength, the wire in 100 feet lengths breaking with a weight of 2800 pounds, while the specifications call for 3400 as a minimum. The wire from Messrs. Richard Johnson & Nephew was exceedingly good in many respects, but its price was much higher than that of Mr. Haigh, even when the duty and freight are taken off. Since the work has been commenced by the contractor, wire has been turned out which has shown even a better tensile strength than that of Messrs. Johnson. A test made last week of a 10 ton shipment wire shows a tensile strength of 4550 pounds with .04 stretch and an elastic limit of 2800 pounds. The equivalent tensile strength per square inch is about 210,000 pounds. This is a considerable gain over the best foreign wire.

### The Stove Manufacturers' Meeting.

We print on other pages a very full report of the first day's proceedings of the National Association of Stove Manufacturers, at their sixth annual meeting held this week in Troy, N. Y. We are usually able to give a report of the two day's proceedings in *The Iron Age* of the following week, but this meeting is so exceptional in its interest, and its proceedings are so important, that in order to publish as much as we feel it necessary to give we are compelled to continue it through two weeks. We hope our readers, especially those in the stove trade, will peruse it carefully. They cannot better employ a leisure hour than in carefully reading and thoughtfully considering the views so freely and intelligently expressed by the manufacturers on nearly all subjects of interest to the trade.

In all respects, this was the most successful meeting of the Association which has yet been held. The attendance was larger than at any previous meeting, the interest greater and the proceedings of more practical importance to the trade at large. Without flattery, we can truly say that we have never seen so intelligent a body of men assembled to represent any of our great national industries. During two days of active discussion there was not one impracticable suggestion made, and not one minute of the Association's time was consumed in idle talk for talk's sake. There was much wit as well as wisdom, but it was wit with a point and served to enforce a practical moral. We doubt if any one industry could marshal a representative body of finer looking, better educated, clearer headed, more genial or more intellectual men than compose the National Association of Stove Manufacturers. Those who attended the meeting, even though coming from long distances and encountering great difficulties in the way of snow blockades and other unusual impediments to travel, were well repaid; those who did not come have much to regret.

During the six years of its life, the National Association has enjoyed an almost unexampled prosperity. From small beginnings, it has steadily gained in strength and influence until it has established itself upon a broad and permanent basis. The many doubts and misgivings

which were expressed by those first asked to join it, have not been justified by anything in the history of the Association, and it ranks to-day among the strongest trade organizations in this country. Membership is an honor as well as a benefit to the manufacturer, and association with the congenial spirits of the trade makes it a perennial pleasure.

Of the social features of the Association we cannot speak too highly. The trouble of attending the meetings is repaid a thousand fold by the benefits resulting from the promotion and encouragement of personal friendships among the members of the trade. It softens the asperities of business life, reduces the friction of sharp competition and strengthens confidence between man and man. Those who come to the meetings go home encouraged and refreshed, with a better opinion of their neighbors and a warmer regard for those who, in the struggle for business, they are often inclined to doubt and distrust. For these reasons we regret that a disposition is manifested to limit the meetings to one each year.

Of the business transacted at the Troy meeting we have not space in this issue to speak editorially. It has given us many good ideas and valuable suggestions, which we hope to lay before our readers in future numbers.

### Sails and Steam.

From the New York *World* of Tuesday, 23d, we clip the following suggestive item in regard to the relative number of steamers and sailing vessels built upon the Clyde:

A remarkable change in the character of the shipbuilding on the Clyde has for some time been going on, and during last year it reached very large proportions. This is the substitution of iron sailing ships for iron steamers, and the change is ascribed in some measure to the increase of late years in the price of coal, an increase which makes it difficult to run steamships at a profit. In 1873 there were built on the Clyde 125 iron screw steamers of 215,000 tons, and only twelve iron sailing ships of 19,000 tons were launched. But in 1876 only eighty-three iron screw steamers were built, while ninety-seven iron sailing ships of 90,000 tons were constructed. This is an increase of more than eight-fold in three years. The change is one which will be welcomed by sail makers and sailors, who generally dislike steamers for reasons of their own.

During the era of economical engines and slow freight boats, it was quite generally supposed that the days of sailing vessels were numbered, and that with the development of iron shipbuilding and a further progress in the direction of fuel economy, sailing vessels would be gradually abandoned. The real points of competition between sails and steam were not understood. The conditions seem to be these: A freight steamer is slow; her model is rarely fine, because sufficient power cannot be afforded for speed; her carrying capacity is diminished considerably by engine and boiler space, while with the best of engines her coal bills are considerable. In addition to this there is a heavy interest account upon engines and boilers, which is largely increased by repairs, depreciation and the necessary allowance to be set aside as a sinking fund.

In the best days of clipper ships their voyages across the Atlantic were almost as good, upon the average, as those of the common trading steamer of the present day. In the olden time it was urged against a full clipper ship that she was so sharp as to materially diminish her carrying capacity when competing with the old-fashioned packet, bluff in the bow and square in the stern—all capacity and no speed. For this reason, as the clippers did not have to compete with passenger steamers in speed, the half clipper came into fashion, and it is a very long time since we have seen a clipper of the Red Jacket type. Now vessels of this class could compete very well in speed with the cheaper class of freight steamers. The reduction of capacity in the sharp model is partly, if not entirely, balanced by the loss of space occupied by engines and boilers, while the saving of the cost and repairs of the engines is almost a clear gain. The coal bill is partly offset by the greater number of hands needed, but a large proportion of it would be saved upon the clipper. Even with the largest margins allowed in favor of the steamer, it seems certain that, for much of the world's trade, the fast clipper ship would be cheaper and more profitable. It is also to be kept in mind that the cost of a clipper is less than that of a steamer, and the cost of taking care of her when she is idle very much less. We may, therefore, take it for granted that, until the price of good economical propeller engines, with boilers, is vastly reduced, the sailing vessel, and especially the clipper ship and three-masted schooner, will stand a good chance in all sorts of ocean trading voyages, and in any kind of work, if we except, perhaps, that of regular lines of packets from port to port. When iron masts come into use for three-masted schooners, these vessels, if of clipper build,

will show themselves greatly superior, not only to square rigged vessels, but also to steamers, since they can be made very fast and can be effectively handled by small crews. About the only complaint against them is that, when dismasted at sea, they have difficulty in getting spars large enough for them in foreign ports, and have to come home bark or ship rigged.

America's experience in building fast sailing vessels is such as to make this indication of a return to sails as a means of propulsion a very hopeful one. Our ships once beat those of the whole world, as our yachts do now, and it is pretty certain that if we should attempt it we could beat the freight steamers with sailing vessels.

#### The Statistical Position of Tin.

At this period of the year the annual reviews and statistics of tin reach us from Europe, and afford us a good opportunity of judging of the position of that metal in the world's markets. The available supply for a series of years is shown in the following table:

	1867.	1868.	1869.	1870.	1871.
English.....	8,700	9,300	9,700	10,250	10,900
Banca.....	4,530	3,052	3,385	5,058	5,239
Straits.....	7,099	5,982	6,271	6,943	9,161
Billiton.....	1,096	1,305	1,737	1,593	2,700
Australian.....	.....	.....	.....	.....	.....
Total.....	21,385	19,639	21,353	22,944	28,054

	1872.	1873.	1874.	1875.	1876.
English.....	9,550	9,970	9,912	9,870	9,400
Banca.....	3,303	4,333	4,049	4,400	4,519
Straits.....	9,785	6,963	7,577	11,300	9,521
Billiton.....	2,946	2,981	3,157	3,525	3,643
Australian.....	150	2,990	5,800	7,215	7,130
Total.....	25,644	27,238	30,535	36,343	34,213

The foregoing shows that the only country whence the supply has materially decreased have been the Straits settlements. This decrease was due to the interruption in trade with that colony while the value of silver and the rate of exchange were temporarily disturbed last year, and therefore has no deeper significance. Production there has not been checked in the least. If in some localities on the mainland of Australia it has slightly diminished by partial exhaustion, the deficiency is more than made good by the larger output of Tasmania.

The deliveries to consumption in England and Holland were 20,829 tons in 1876, against 19,458, 14,253 and 11,310 in 1875 to 1873. In the United States they were 4472, against 4273, 4629 and 4313. The three leading tin consuming or distributing countries together consequently delivered 25,801 tons in 1876, against 23,731 in 1875, 18,882 in 1874, and 15,623 in 1873. On comparing this with the general supply during the corresponding years 1876 and 1873, we find that while the latter since 1872 increased 25 per cent., the three leading countries absorbed or delivered, in 1876, 62 per cent. more than they did in 1873.

The probable actual yield for 1876 we estimated a year ago at 32,100 tons. When the figures arrive from the East this will, we believe, prove to have been correct. Europe and America consumed last year, according to estimates from London, 34,000 tons, against 32,500 and 27,000 in 1875 and 1874. From this it is evident that tin at the comparatively moderate prices that prevailed during 1876, is very freely taken in the principal consuming countries, notwithstanding the dullness in general trade and the lessened demand for tin plates. It is, we presume, employed as an alloy for many purposes for which formerly it was too dear. In spite of these rather favorable circumstances, however, the statistical position in England and Holland has not improved, as will be seen from the following tables:

	1877.	1876.	1875.
Jan. 1.	Jan. 1.	Jan. 1.	Jan. 1.
London.....	7,648	6,019	2,895
Banca.....	1,684	2,872	4,235
Billiton.....	1,047	970	968
Australian in Holland.....	730	.....	.....
Total.....	11,109	9,860	8,109

	1877.	1876.	1875.
Jan. 1.	Jan. 1.	Jan. 1.	Jan. 1.
Straits.....	750	805	1,850
Banca.....	470	403	309
Billiton.....	1,800	1,000	715
Australian.....	2,000	2,183	1,300
Total.....	4,720	4,391	4,165

The visible supply, it will be seen, was 15,831 tons on the 1st inst., against 14,251 in 1876 and 12,274 in 1875. The price of Straits was £75. 10/, against £81 and £95.

Prospects for the coming season in Europe are doubtful. There is nothing that we can now discern to hinder the free expansion of tin production. Consumption, it is true, may go on increasing in the same ratio at which it has been developing of late years—sufficiently so to counterbalance a too copious output; yet the statistical position may not materially improve, and if this should happen, speculators for a rise would hardly feel encouraged to attempt controlling the metal, even supposing the money market remained easy. But the latter may at any moment become disturbed by political events con-

nected with Eastern affairs, obliging weak holders of tin to realize, and in that case the price of tin would in all probability decline.

#### The Responsibilities of Mechanics.

We find the following in a Western paper:

A plumber in Cincinnati sued a customer for a bill of \$300. His demand was met by a counter suit in which the customer recovered \$2000 damages on account of the injury to his property from the way in which the plumber had done his work.

Why not? We have in many cases seen costly houses, elegant in finish and supplied with all the modern conveniences, rendered untenable by bad plumbing. What is the owner of such houses to do? If entirely indifferent to consequences he can let it and leave the unfortunate tenant to incur the risk of sewer gas poisoning, or he may occupy the premises himself and trust to his life insurance policy to indemnify him in case of death from typhoid fever, pythogenic pneumonia, or any one of the long list of diseases which find their origin in decomposition going on in our sewers. If, however, he be not ignorant of nor indifferent to the dangers inevitably attendant upon defective drainage, he can only correct the defects at great cost and inconvenience. Walls must be broken, floors torn up, wood work pulled to pieces and the house rendered uninhabitable for weeks. Under these circumstances, why should not the plumber who contracts to do his work in "a workman-like manner," and in accordance with the spirit, as well as the letter, of the architect's specifications, be held responsible? The plea that the materials and workmanship were as good as he could afford for the price agreed upon in the contract, is no plea at all. A man has no right to avail himself of the ambiguities and omissions of a set of specifications on the one hand, or of the ignorance or credulity of an owner on the other, to "scamp" a job so that he may make a profit out of a price which would not cover the cost of what he agrees to do, if he were to do it properly. There is altogether too much dodging on the part of plumbers of the moral and legal responsibilities of their business. For the bad work of the time they blame the contract system, which forces the plumber who wants a job to bid below all competitors; but if reputable men would refuse to bid upon specifications against irresponsible competitors, we should know where to draw the line between the two classes of mechanics composing the trade.

#### Winter Regarded from an Economic Standpoint.

The present winter is probably regarded by a majority of people as an exceptional one, and upon this ground the business community, the railroads, shippers by water, and in fact the whole commercial world, justifies any delay or inconvenience which is due in any way to the weather. Now, this seems to us all wrong, because we well know that once in a few years we are sure to have just such a winter. In 1866 or '67 we had a winter of great severity, with much snow; again in '72 or thereabout, came another winter with heavy snows, great cold and a general resemblance to an arctic climate. If we are not mistaken, there has been one very cold winter since. In other words, we have had three or four "exceptional" winters in ten years, and on looking further back they are found to have been pretty frequent, as far as the records go. We must, therefore, accept them as a part of the expectations of our climate, and by doing so we shall greatly reduce the injury which they occasion to trade and commerce, for we shall then prepare ourselves for them to a certain extent.

The snow and ice this winter have been very serious obstacles to all kinds of business. In this city it is probable that the actual cost of moving a ton of merchandise has been more than doubled during the snow blockade. On the water it costs more than double to send a ton of coal from this city to Boston, while the danger of moving freight in the harbor is so great that comparatively little can be done. The trouble which railroads have had will cost them many millions of dollars. Mile after mile of cuts are full to the roofs of the cars and out to the wings of the snow plows. One curious fact in regard to this is that the further south we get the greater is the delay which a trifling fall of snow causes. This is usually accounted for by the fact that where snow falls only occasionally little preparation is made to meet it. In the latitude of New York, where snow drifts but little, it ought not to present any obstruction to travel by rail. Large snow plows are not needed; small ones will do the work, and in the present

day of signal service weather reports, a snow storm need not take us by surprise. The business man and householder ought to be prepared for snow, since it is pretty sure to come abundantly once in three or four years, and it sometimes happens that the expense and delays which are caused by one storm are great enough to pay for all necessary precautions. In the future we are likely to have severe winters recurring at irregular intervals and alternating with winters extremely cold. The climate of a large portion of our country is sub-arctic in winter and semi-tropical in summer, yet people build houses and stores, carry on business in general, lay water pipes and build heating apparatus, as though May and November represented the extremes of our climate. For example, we build cities in which half the roofs are flat, and yet we know that any winter they may be loaded with 18 inches of snow and ice which must melt in position, and which will load them nearly to their limit of strength. If we consulted the conditions and built to meet them, the steep roof would always be used. In the matter of water pipes it is notorious that they are laid as though frost were an unknown visitor, while on a cold and windy winter's day nobody expects a building to be comfortably warm.

That such is our architectural practice and our business habit is not to be wondered at, since, as a nation, we are not yet adjusted to "the environment," but we may expect that as we progress these things will receive due attention. Our harbors are less troubled with ice in severe weather now than they were 50 years ago, and it is not impossible that in the future the Hudson may be kept open for the greater part of its navigable length during the whole winter. It only needs consideration and a determined effort to enable us to overcome most of the evils entailed by severe cold and heavy snow.

Turkey evidently means business; whether Russia does remains to be seen. On the 23d inst. the British iron steamer *Lotos* sailed from New Haven for Constantinople direct, having the most valuable cargo which ever left that port. It consisted of rifles and ammunition for the Turkish government, as follows: 70,000 Martini-Henry rifles, bayonets and scabbards; 1000 Winchester guns, 10,000,000 cartridges, 15,002,400 Martini shells, 15,000,000 bullets and 50,000,000 gun wads. The value of the cargo is \$1,769,100. Should the promise of war be realized, our manufacturers of the munitions of war will probably be kept busy with foreign orders. Just now it looks as if this country is about to become the world's armory.

#### The Education of the Hand.

The Philadelphia *Ledger*, in an article on this subject, says:

It is an encouraging sign that the popular view of education is ever becoming broader and broader. Once it was limited to the common branches now taught in our primary schools. To know how to read, write and cipher was esteemed a fair education for a boy, and a liberal one for a girl. Now it is but a beginning—an introductory chapter to the volume of studies comprised in any respectable system of instruction. It is, however, almost wholly in the direction of mental development that this expansion of view has taken place. It is only now beginning to draw upon the public that the mind is but one part of the man; that the eye, the ear, the taste, the hand, also need education, in order to fulfill their mission in the best manner.

Especially do we mean to recognize the claims of the hand to specific training. When we consider the large proportion of life's necessities and comforts which are wholly dependent upon the skill and dexterity of this physical member; when we recollect how important a part it plays in the civilization and happiness of mankind, and how constantly it is called into service of some kind by most of us, it seems strange that it should be left so largely to chance or to the mere habit of practice for its education. It is true that machinery has superseded much manual labor, but it has not, therefore, provided for the folding of the hands in idleness. On the contrary, it has taken upon itself the heavier and more automatic part of the work, leaving that which requires more adroitness and dexterity, and thus making the education of the hand even more necessary than before.

As yet this branch of education has received but slight attention from either parents or teachers. The child's time is usually divided between study and play, and no systematic arrangement is made to cultivate his manual skill. His powers of thinking are trained with care; his powers of doing are left to themselves. The result is only what must be expected. The boy and girl on leaving school have acquired much valuable information, much facility of thought, and much mental force. The memory, reasoning powers and imagination have all been strengthened by active exercise. The taste for study has been implanted, and a desire for still further advancement has been stimulated. This is all excellent, and we would not disparage it by a single word. But how is it with the hand, that wonderful instrument, whose possibilities have never yet been fath-

#### Condition of the Blast Furnaces of the United States, January 1st, 1877.

(Compiled for The Iron Age.)

LOCALITIES.	Charcoal.				Anthracite.				Bituminous Coal and Coke				
	Total number of stacks.	Number reported in blast.	Capacity pr. week.	Number reported out of blast.	Total number of stacks.	Number reported in blast.	Capacity pr. week.	Number reported out of blast.	Total number of stacks.	Number reported in blast.	Capacity pr. week.	Number reported out of blast.	
New England.....	18	5	340	13	834	1	130	1	130	1	130	1	
New York.....	17	6	397	11	649	43	8,470	25	6,075	14	2,770	1	
New Jersey.....	43	11	497	32	1,497	16	290	2	390	1	130	1	
Pennsylvania.....	49	23	4,850	26	2,600	50	16,275	34	5,510	16	2,885	1	
Lehigh.....	25	9	1,630	16	2,050	36	3,070	17	2,090	11	6,292	5	
Schuylkill.....	10	4	1,000	6	1,000	10	4,405	6	600	31	12,865	10	
Upper Schuylkill.....	25	9	1,630	16	2,050	36	3,070	17	2,090	11	6,292	5	
Lower Schuylkill.....	10	4	1,000	6	1,000	10	4,405	6	600	31	12,865	10	
Pittsburgh.....	10	4	1,000	6	1,000	10	4,405	6	600	31	12,865	10	
Allegheny Valley.....	10	4	1,000	6	1,000	10	4,405	6	600	31	12,865	10	
Shebang.....	10	4	1,000	6	1,000	10	4,405	6	600	31	12,865	10	
Yough.....	10	4	1,000	6	1,000	10	4,405	6	600	31	12,865	10	
Johnata, Conemaugh V.....	17	7	480	10	430	3	175	2	375	4	455	4	
Maryland.....	27	5	138	22	933	1	175	1	175	5	100	4	
Virginia.....	7	1	40	5	372	1	1	1	1	1	1	1	
North Carolina.....	6	1	40	5	372	1	1	1	1	1	1	1	
West Virginia.....	6	1	40	5	372	1	1	1	1	1	1	1	
Ohio.....	1	1	1	1	1	1	1	1	1	1	1	1	
Michigan.....	1	1	1	1	1	1	1	1	1	1	1	1	
Illinois.....	1	1	1	1	1	1	1	1	1	1	1	1	
Indiana.....	1	1	1	1	1	1	1	1	1	1	1	1	
Wisconsin.....	1	1	1	1	1	1	1	1	1	1	1	1	
Minnesota.....	1	1	1	1	1	1	1	1	1	1	1	1	
Missouri.....	1	1	1	1	1	1	1	1	1	1	1	1	
Iowa.....	1	1	1	1	1	1	1	1	1	1	1	1	
Nebraska.....	1	1	1	1	1	1	1	1	1	1	1	1	
Kansas.....	1	1	1	1	1	1	1	1	1	1	1	1	
Colorado.....	1	1	1	1	1	1	1	1	1	1	1	1	
Utah.....	1	1	1	1	1	1	1	1	1	1	1	1	
Oregon.....	1	1	1	1	1	1	1	1	1	1	1	1	
Total.....	285	73	6,630	209	18,275	223	87,164	136	25,910	207	84,216	123	25,988

omed? Is it swift in motion; firm, yet pliable; quick to adapt itself to new requirements? Has habit made manual employment easy and pleasant? Is there a taste for any of the different varieties of hand work, a desire to excel in them, a sincere respect for them? Commonly, the reverse is the case. Too often the youth is thoroughly indisposed to gain his livelihood by any description of manual industry, and the girl as disinclined to take a part in her mother's household affairs. This is partly because they have learned to look down upon such labor as something beneath them, and partly because they are conscious of an inferiority of power to execute it well.

It is plain that such a condition of things, if general, would be fatal to all our material interests. But it is more than even this. It is fatal to the development of each man and woman. Individual excellence consists mainly in the proper balance of all the faculties, and when some of them have been suffered to run to waste there must be a proportionate incompleteness of the whole. The education of the hand is necessary to bring out the best results of other training. "We must learn by doing," is a favorite kindergarten motto, and one which lies at the root of that valuable system. Industrial schools are also accomplishing much in this direction, and the various schools of design, and similar opportunities in other branches, now opening up to the youth of both sexes, show that the public sentiment is awakening to the importance of this part of education.

It is, however, chiefly at home that we must look for the best accomplishment of this work. Nowhere are there better opportunities for the cultivation of the hand and heart together than in the performance of household duties and kindly offices among the members of the family. Children who are trained to perform a certain portion of these duties regularly, and accustomed to assist their parents in whatever they may have to do, will be happier, more useful, better developed and more tenderly attached to the home which they have helped to make, than those who, through mistaken indulgence, have never been called upon for such exertions. Parents are largely responsible for this part of the children's education. Study and play should not absorb their whole time; a part should be held sacred to home and its interests, and in such natural pursuits the hand will become skillful, and the respect due to honorable labor will be engendered.

#### Increased Locomotive Service.

The *Railway Age* says: For a good many months several of our railway companies have been experimenting on the idea of increasing the service of their locomotives to double or more the old runs, while changing engineer and fireman at the usual intervals. Opinions continue to differ as to the advantage of these long runs, but so far as we learn, where the plan has been fairly tried the results have been found satisfactory to the managers, although the engine men, and sometimes the machinery department, are disposed to assert that the engines are being overworked.

The New York Central and Hudson River Road has made a very thorough test of the principle, and we learn that for some time 50 engines have done the work, in freight trains, formerly done by 80, thus dispensing with say \$300,000 worth of machinery in the freight service alone. Of course the 50 engines have had harder work and needed more repairs than they ordinarily would, but it is likely that the extra repairs have anything like equaled the saving effected, taking into account the extra hands required in the old way for cleaning, watching and turning, the cost and wear of firing up, etc., to which is to be added, if the practice is made permanent, the large saving in capital invested. As an illustration of the great amount of work that may be obtained out of an engine, we are informed that one on the New York Central made 8436 miles in a month. The average locomotive mileage on the old plan is hardly more than 2500 miles per month.

In order to learn the results of practical experiments nearer home, the writer, a week or two ago, visited the shops of the Illinois Central Company, which have recently commenced the long-trip system, and obtained from the assistant superintendent of machinery, Mr. Jeffrey, some interesting facts. Commencing with October last, the passenger engines which had previously run from Chicago to Champaign, 127½ miles, are run through to Centralia, 252½ miles from Chicago, the engineers and firemen being changed at Champaign. Two trains each way are thus arranged. Similarly, two passenger trains each way are run daily between Centralia and Amboy, 238 miles, the engineers and firemen being changed at Wapella, the former end of the engine run; and another similar run is made from Amboy to Waterloo, 210 miles, engine hands being changed at Dubuque. On these three runs 12 engines do the work which 24 were formerly doing.

Some of the freight engines have been given similar runs. All now run through from Amboy to Waterloo, 210 miles, the men changing at Dubuque; one runs through between Amboy and Centralia, and three have lately been placed upon the long run, between Chicago and Centralia, 252½ miles, one train running each way daily with two sets of hands. By this arrangement 18 engines—12 passenger and six freight—have been relieved from service; there has been a saving at the three intermediate stations, where engines were formerly changed, of about \$50 a day for men to clean, turn, watch, etc., and [about \$18 in the cost of firing the now surplus engines, to say nothing of saving the wear and tear to boilers from so frequent heatings and coolings, the cost of housing, and other station expenses where engines are kept. The following figures show the performances of some of the engines on these runs:

Engine 44 (passenger) made 7222 miles in October at the rate of 47 miles to a ton of coal (soft) and 16 miles to a pint of oil; in November, 7116 miles, averaging 48.4 miles to a ton of coal, 14 miles to a pint of oil. Engine 175, in November, 6333 miles, 46.9 miles per ton coal, 12 miles per pint oil. Engine 128, in October, 6720 miles, 45.1 per ton coal, 17.87 per pint oil. This shows a more moderate consumption of fuel than the average for this and most other roads. So far as we can learn, the repairs on these engines have not increased at all in proportion to the saving effected. The officers of the road are very confident that the experiment is a success.

One very important principle, at least, has been settled by the various tests of the long run question. The locomotive equipment of many of our roads might be considerably reduced without diminishing the capacity of the road for business, and hence new roads can be equipped at less outlay than was heretofore considered necessary. It is a very material consideration to many new companies to be able to save one-half or one-third in the number and cost of their locomotives, and many old companies would be very glad to have in hand the money spent for the engines which they now find they can dispense with.

**Restoring Faded Ink.**—Mr. Garfield, of Southport, England, describes in the *Pharmaceutical Journal* a method he successfully employed for restoring the legibility of a letter which had been submerged in the wreck of the *Schiller*, and which was quite illegible until submitted to this process. The letter was carefully brushed over with solution of anhydrous cyanide of potassium (1 in 20), and then, still damp, held over a dish containing hot hydrochloric acid. The writing thus developed was of a deep red color. The philosophy of the process is this: The iron of the ink is precipitated as peroxide upon the fibers of the paper, and remains when all other coloring matters are washed away. Being in an insoluble form, however, no effect is produced by the reagent until the fumes of the acid have rendered it soluble. Probably ferrocyanide of potassium would answer as well or better than sulphocyanide.

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#### SPECIAL FEATURES.

**Notes of Novelties.**—This is a department of the journal always watched with interest by the retail trade, as it contains an account, from month to month, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated. **Special Correspondents.**—The "IRONMONGER" has a deserved reputation for its special correspondence from all the principal manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the "IRONMONGER." **The Month, and Legal and Magisterial News** are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above there is a carefully classified list of Patents, together with Editorial and Foreign Notes, Statistics, &c., &c.

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are inserted in "THE IRONMONGER AND METAL TRADES' ADVERTISER" at the subjoined rates: Whole page, £5; Half-page, £2 15/-; Third-page, £2; Quarter-page, £1 12/-; Sixth-page, £1 2 6/-; Eighth-page, 18/-; Sixteenth-page, 10/-—subject to a discount of 10 per cent. if ordered for seven, or 20 per cent. if ordered for thirteen insertions, one out of the thirteen, and also one out of the seven (if the order is given after July 1st of current year) appearing in the Diary. American subscriptions may be paid and advertisements arranged through the publisher of *The Iron Age*, 10 Warren Street, New York. The tariff above will be adhered to, reckoning U. S. currency at the rate of \$5 to the £.

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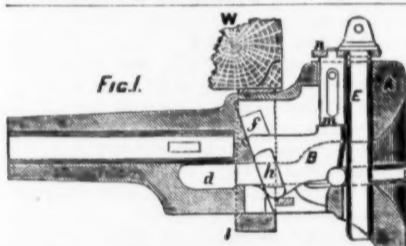
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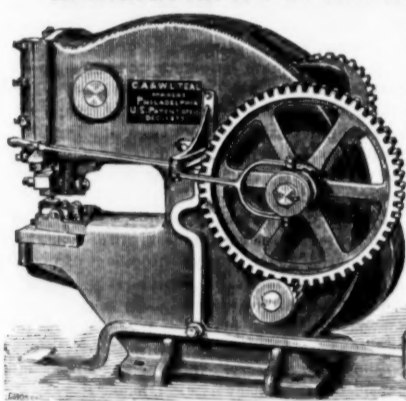
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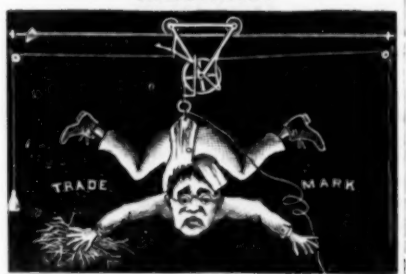


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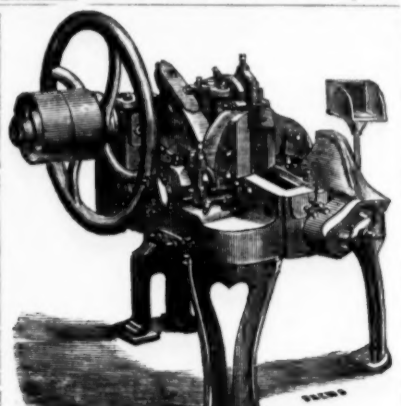
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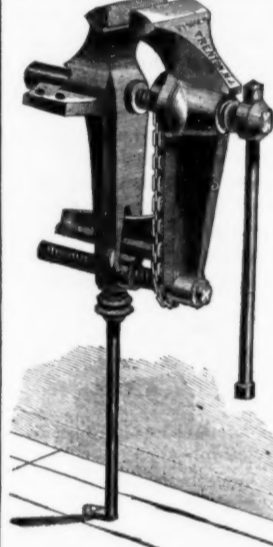


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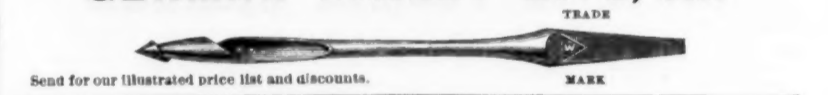
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## The National Association of Stove Manufacturers.

### Sixth Annual Meeting.

As announced in our last issue, the National Association of Stove Manufacturers held their sixth annual meeting in Troy, beginning on Wednesday last and continuing through two days. The meeting was called to order at 11 a. m., January 17th, by Mr. S. S. Jewett, president. The following members and invited guests were present:

P. B. Acker, of Union Stove Works, New York.  
S. H. Ransom, Joel R. Ransom, Albion Ransom, of S. H. Ransom & Co., Albany.  
Wm. P. Abendroth, of Abendroth Bros, New York.

A. Bradley, Pittsburgh.  
Eseck Bussey, John O. Merriam, Chas. A. McLeod, of Bussey, McLeod & Co., Troy.  
C. H. Buck, of Buck Stove Co., St. Louis.  
Geo. C. Burdett, W. S. Smith, of Burdett, Smith & Co., Troy.

A. N. Patton, of Brooks & Patton, Columbus, O.  
C. H. Seneseny, of Joseph Bell & Co., Wheeling, W. Va.  
O. H. Bush, of Chamberlain & Co., Cincinnati.

N. Brayer, H. Cribbin, of Co-operative Foundry, Rochester.  
W. H. Tefft, of Detroit Stove Works, Detroit.

D. M. Thomas, of Detroit Iron & Brass Manufacturing Co., Detroit.  
Henry Lape, of Chicago Stove Works, Chicago.

Chas. Eddy, Geo. C. Baldwin, Jr., Aug. P. Corse, of Eddy, Corse & Co., Troy.  
N. L. Ely, of Ely & Ramsay, New York.  
G. F. Filley, of Excelsior Manufacturing Co., St. Louis.

Thos. Jones, of Foxel & Jones, Troy.  
Joseph W. Fuller, John H. Warren, Geo. A. Wells, Walter P. Warren, of Fuller, Warren & Co., Troy.  
B. F. Fales, Troy.

L. H. Giles, of H. G. Giles & Son, Troy.  
C. O. Greene, Troy.  
George Elliott, of Highland Foundry Co., Boston.

John B. Herron, Pittsburgh.  
A. S. Hubbell, H. S. Hubbell, of Hubbell Bros, Buffalo.  
S. S. Jewett, Josiah Jewett, of Jewett & Root, Buffalo.

Wm. J. Keep, Troy.  
D. G. Littlefield, of Littlefield Stove Mfg. Co., Albany.  
Jeremiah Dwyer, of Michigan Stove Co., Detroit.

C. Olhaber, Cincinnati.  
A. N. Parlin, John Magee, of Magee Furnace Co., Boston.  
S. T. Peckham, of J. S. & M. Peckham, Utica.

G. H. Phillips, W. A. Clark, of G. H. Phillips & Co., Troy.  
J. B. Resor, of Wm. Resor & Co., Cincinnati.  
John F. Rathbone, Grange Sard, Jr., Edward Bowditch, of Rathbone, Sard & Co., Albany.

Samuel W. Perry, of Swett, Quimby & Perry, Troy.  
Wm. T. Southard, Wm. H. Foster, of Southard, Robertson & Co., New York.  
J. V. Vrooman, Jonas H. Clute, John Keyes Paige, of Schenectady Stove Co., Schenectady.

Crawford Spear, of Jas. Spear & Co., Philadelphia.  
U. Hill, Jr., of Union Stove Works, New York.  
Jordan L. Mott, of J. L. Mott Iron Works, New York.

Van Wormer & McGarvey, Albany.  
W. H. Whitehead, of Tibbals, Shirk & Whitehead, Erie, Pa.  
Henry A. Wood, of Wood, Bishop & Co., Bangor, Me.

David Williams, publisher, James C. Bayles, editor, *The Iron Age* and *The Metal Worker*.  
Samuel H. Keep, of Wager Stove Co., Troy.  
A. McVein, of Sill Stove Co., Rochester, N. Y.  
N. A. Boynton, of Richardson, Boynton & Co., New York.

After the approval of the minutes of the last meeting as published, Mr. Jewett addressed the Association as follows:

#### THE PRESIDENT'S ADDRESS.

GENTLEMEN: In accordance with the provisions of our constitution, we are again gathered together to do what we can to promote the best interests of a trade probably without a peer in the ranks of manufacturing industries.

We are assembled in the city of Troy, a representative city of our trade, for it contains within its limits and in its suburbs an unusual number of stove foundries, affording occupation to an immense number of operatives and employing capital almost without limit.

The representatives of this vast local industry have cordially invited us to meet with them here, in what may appropriately be styled "the home of the stove trade," and to revive, under the head waters of the Hudson those intimacies which originated upon its lower banks several years ago.

As we now reflect with satisfaction upon the fact that this is our sixth annual meeting, and as we recall the various incidents in the history of our Association, we cannot fail to observe a remarkable resemblance between the present condition of the stove trade and the state of affairs which existed at the time of our organization. At that time the alarming condition of the trade prompted the idea of an organization, and stimulated the efforts which resulted in its formation. Overproduction was then a disturbing element; the necessary rivalry in producing new designs and improvements was the policy of enterprising firms; but by far the most powerful cause of evil was the absence of a mutual acquaintance between the manufacturers and the loss of good feeling toward each other. It is no exaggeration to assert that the trade has suffered more injury from the cause just named than from all others combined. Uter strangers to each other, deeply interested in competing goods, could not be expected to act in harmony; it required acquaintance and association to develop good-will and cordial intercourse; to bring out the points of common interest to the whole fraternity; to understand them more thoroughly by united wisdom, and be ready to act simultaneously in matters of vital importance. The Association was then founded, and with its career you are all quite familiar. It has guided us from low, unremunerative prices through a rapid advance, forced by the enhanced cost of all articles entering into our product, and also steered us down the bill of decline, caused by the reaction in prices of raw materials.

To-day we look upon a scene similar to that which brought us into existence. Overproduction has steadily increased until it is now a very serious element in our calculations. The rivalry in developing new ideas to captivate the public never has been so intense; nor is there any prospect of its moderating until the production of stoves is only equal to or less than the demand for them.

There are, however, new sources of trouble which are well worth our attention. The delivery of goods "to be paid for when sold" is a curious problem to consider. Many retailers have their floors largely stocked with such goods, in which they have no interest; their money is invested in other patterns on which they concentrate all their efforts; they know too well that the manufacturer of the articles "on sale" is in their power and must ultimately lose, either by reducing the price or sending the goods elsewhere. This point is not only suggested by the placing of samples, but by manufacturers sending ten, twenty and even thirty stoves on this dangerous plan. A manufacturer cannot afford to place himself in such a position, unless he expects to meet the situation and gracefully yield to the demands and disputes arising from it.

In this connection I cannot forbear some reference to the low methods adopted by very many salesmen who are employed by honorable firms to represent their interests in the sample room or at the home of the customer. A manufacturer must take an honest pride in the product of his brain, and it is a pleasant duty for him to impress upon the minds of purchasers the particular points embraced in his wares. To the earnest presentation of such features, strategy and business integrity dictate a firm adherence, and discountenances the seeking of trade by misrepresentation of the grossest character. The goods made by every member of this Association have features strong enough to capture their fair share of patronage. More trade can be secured by honest statements than has ever been acquired by vilifying the character of opponents and misrepresenting the facts about competitors and their wares.

Let each member reflect upon this matter and consider whether he has taken care to do his part in elevating the standard of commercial honor and keeping it free from the taint of suspicion. There have been other powerful causes at work to depress our trade. Although worthy of a passing notice, yet they were but temporary, and no matter how injurious may have been their influence, yet they are not likely to occur again for a term of years. I allude to the Centennial Exhibition and the presidential campaign.

It was our privilege to meet at Philadelphia in June last, and enjoy the hospitality of our brethren in that vicinity. It was also our opportunity for visiting the Centennial Exhibition, which was then about complete. We inspected the goods produced by the skill of the world, and recognized their perfection. We admired all the surroundings and wondered at the remarkable success of a management capable of producing such marvelous results.

It was a credit to all engaged in it; it was justly the pride of the nation. Nor do I, in my humble sphere, venture to assert that its influence will be wholly injurious, for I have quite a contrary opinion; but it is my duty to mention a feature which exerted a temporary influence far from beneficial. The total number of paid admissions to the grounds was eight millions four thousand two hundred and seventy-four. Assuming that each admission represents the modest sum of twelve dollars paid out for individual expenses, and we find one hundred millions of dollars employed in this unusual manner. The true source of this money was not the ordinary channels of trade, checked the power of the people to pay previous obligations, and to again purchase the articles then in season. A restricted fall demand was the inevitable result, and even that was made still less for the stove trade by the moderate temperature which prevailed until quite recently.

In every campaign where the presidency of the United States is the prize to be awarded to the victorious party, it has been noticed that the people devote so much time to political matters as to seriously interfere with every trade depending upon the fall season for the sale of their wares.

The recent campaign excited the proper amount of enthusiasm under which the election took place. Then followed an era of intense doubt concerning the result; the question of the safety of the Republic was discussed in the most prominent circles; citizens patriotically feared for the safety of their native land as they realized the crucial test to which the system of the Union was then subjected.

Up to the present time wise counsel has prevailed; confidence has been restored, and every indication strengthens the belief that our only safety is to strictly adhere to the Constitution which has protected us during a hundred years. The Constitution of the United States was a wise compromise between the doctrine of state rights and the desire for a popular vote. It combines nearly all the elements of permanence; what it lacks we can safely add by amendment.

Under such an accumulation of unfavorable influences we may well wonder at the stability of the stove manufacturers who have encountered the storm and resisted its pressure so well.

One more remarkable feature in the fluctuations of trade has impressed itself firmly upon my mind, and I trust my good friends in the East will pardon me for introducing it here, and will recognize in it whatever of truth it may contain.

The records of the past often abound in salutary instruction for succeeding generations. In ancient history we read of the great cities where the business of those days was transacted, the established centers of commerce, whose merchants were famous for the enterprise which brought into their coffers gold from a distant land, and whose ships plowed all the waters of the known world. After an interval of time, with the decline of civilization in the East, their commercial power vanished completely. Then a Western power appeared to upraise the golden scepter, and maintain it for centuries. At last, she too experienced the withering blast of adversity, and her insignia of power disappeared forever. I find no instances in the past of any recovery of a lost commerce. There are no retrograde movements in the course of trade.

Such has been the tendency in remote ages, and in our day we do not look in vain for resemblances to it. In modern Europe similar mutations (not perhaps so general) also appear. Already the financial and commercial influence of England has been seriously weakened by the decline in important branches of industry, wherein she was formerly supreme; but they have eluded her grasp and passed into the hands of a Western nation, without hope of recovery.

In our own country, let us review an instance of a similar disturbance in a special trade. Some forty years ago the stove trade was all transacted in this vicinity. The foundries on the Hudson were a sea of empire; around its throne were annually congregated all who wanted their product, whether they were dealers in the South, North, East or West; from far and wide all gathered here to pour out their treasure in exchange for the goods that they could not procure elsewhere. With the progress of time the settlement of the country has continued, moving gradually Westward and carrying with it not only the civilization peculiar to agricultural life, but also the seeds of mechanical industry, which in our trade have been planted far and wide. Originally nurtured by the elements of location only, they have received a further stimulus from the erection of an unusual number of blast furnaces in all sections of the land, until the goods can be made and marketed in the West as cheaply

as in the East. With experience and cultivation, their product has passed from the rude condition of a pioneer art into a state of perfection equal, if not superior, to any manufactured in the foundries of the East. Thus, again, has the scepter of power moved Westward, never to return. Down the line west of it will be transacted by the foundries similarly located. Reductions in the price of pig iron and all raw materials, or any other element entering into the cost of stoves in the East will not revive the former supremacy; for the West will strengthen its grasp by similar methods. The wise men of the East can only watch the Star of Empire in its westward flight.

It would give me great pleasure to report to you that the past year had been prosperous for the stove trade; but the record of the year does not permit me to do so.

It would be also gratifying to me and acceptable to all the fraternity could I point out a future glowing with immense profits, but the facts would not sustain or warrant the creation of any such delusive hope.

In all my remarks concerning our trade to-day, and in all that I have made hitherto, which I now reiterate, it has been my aim to place before you the exact truth as far as it was in my power to do so. If there has been any fault, judging from the results, it exists in the fact that I have not been endowed with the power of an orator to impress the ideas firmly upon your minds.

Perilous times are here, and we need all the wisdom that can be derived from our past experience to guide us safely in the future.

In closing my remarks about the outlook for the future I am led to believe that the trade of the whole country, in a wide, comprehensive sense, rests upon a better foundation than it has for some years. The financial storm is subsiding and the sky is becoming clear. Our currency (if let alone) will soon be exchangeable for gold on an equal basis. Prices of all commodities are already adjusted to that level, so that the reaction from the times of inflation is about complete. Henceforth the natural growth and resources of the country will be developed without restraint.

Mr. John Walter, proprietor of the London Times, expressed himself as follows:

"I regard the 'hard times,' he said England was suffering much the same as the United States, from industrial and commercial depression. In his estimation, the business troubles were much worse, however, upon the Continent, more especially in Germany. France, always the lucky nation whose crops were good and whose people lived and thrived upon almost nothing, was the richest of them all; but America he found was not far behind. With her wonderful resources of coal and iron, and her manufacturing and agricultural resources, the United States would soon shake off their present commercial lethargy. In one way America had strangely reversed the natural order of things. Manufacturers generally were a result of agriculture, and people only came to towns after the agricultural interests had been fully developed. But here this was not true. With room for hundreds of millions in many of the states, the manufacturing element had been directed so far out of its proper position that they already went up to too many manufacturers. Despite the enormous grain and vegetable products of the United States, their agricultural resources had only been touched, not worked."

#### THE BANKRUPT LAW.

It was a part of our duty at Philadelphia to consider the operations of this law, which was enacted to enforce and protect the rights of creditors and debtors impartially, but in actual practice was serving a purpose different from what was intended by the authors of it. It actually opened a legal way for dishonest debtors to make fraudulent settlements with unsuspecting creditors, under the cover of what is well known as "compromising." The remarks and discussions upon this subject appear in your published proceedings, and they are well worthy of careful attention. Since the action of this Association was announced I have taken great interest in watching the effect. In my opinion it has been beneficial in a marked degree. I have no doubt that during the past seven months the number of compromises proposed to or accepted by stove manufacturers has been materially reduced, as compared with the corresponding interval last year, or as compared with the record of other trades. The satisfaction which we experience over our action is not, however, confined to our part of this trade. It is not considered beneficial by manufacturers only, but also by every honest merchant, as appears in the following extract from a letter written to me by a retailer in the West:

"I permit me to congratulate yourself and the Stove Association on the stand taken concerning compromises and bankrupts. The curse of the present system of settling with dishonest men results in serious detriment to honest dealers. I go for such honesty as Mr. Filley's."

We cannot dwell too long upon the evils of the compromise system, or take too high a position against the disposition to tamely submit to them. The strongest advocate of the practice must inevitably base his arguments upon the idea that the unfortunate applicant is an honest man. Yet when goods are delivered to even an honest man, is it not an implied part of the terms of sale that the buyer shall devote his personal efforts and zeal to the disposal of the merchandise? Sales would rarely be made unless such an expectation existed. It surely cannot be a part of the bargain, that upon receiving the articles the buyer shall calmly decline to execute that part of the contract, and holdily tell his creditors to get what they can out of the goods. Such an act is dishonest and may well be styled a breach of trust.

It is a profitable investment for any manufacturer to take a firm stand, now at this time, and resolve that henceforth and forever he will accept no compromise offers. An increase in losses during the present year will be more than repaid by the increased safety of mercantile transactions afterward. The indications now point to a very large number of embarrassments among a class of dealers formerly in good credit, but, meeting losses which have seriously diminished their resources, they have carefully concealed their condition, hoping to recover; but at last they too abandon that hope and lose their courage, incentives to labor which the customary manipulations of the bankrupt law render legally unnecessary.

Let us face the situation and so act that all merchants who accept from us what amounts to a fiduciary trust shall be held responsible for their actions. It will not then be said of us as is cleverly stated in the following extract from an article written by Lewis L. Delafield in the December number of the *Penn Monthly*:

"It is one of the consequences of the loss of a high standard of public morals that crimes have lost their names as well as their punishment. The advocate who appropriates his client's property or misapplies funds committed to his care is now said to be guilty of a breach of trust, and courts have been found willing to view such crimes more leniently than that of the pauper who steals a loaf for his subsistence. Legislation is needed to make the willful appropriation or misapplication of property by attorneys, executors, trustees and all persons occupying fiduciary positions, a criminal offense, punishable by imprisonment in the state prison. It is a notorious fact that the American may be cheated with impunity, without

making any effort to obtain redress, while his English cousin will enforce the least violation of his rights with the utmost rigor."

Let it rather be our aim to deserve the following encomium, which is taken from the same article:

"Merchants have learned that honesty is not encouraged by easy compromises, or releases and extensions impudently asked and indifferently granted. They have found that the honest suffer from the fraudulent escape, and that the upright tradesman who pays his debts is always undersold by the rogue who buys dear on credit to sell cheap for cash, without any intention of paying, and relying upon the ill-judged leniency of creditors to discharge him when bankrupt, and launch him again on a new career of fraud."

Permit me here to state that, pursuant to your instructions, I have caused suitable petitions to be prepared and transmitted to the Senate and House of Representatives praying for the repeal of the bankrupt law.

The secretary has also mailed a copy of our June proceedings to the Secretary of the National Board of Trade, at the same time advising him of our action on this important matter.

#### REGISTER OF NAMES OF STOVES, ETC.

The secretary has completed the register of names of stoves, ranges and furnaces authorized at the June meeting; copies of it have been mailed to all the members of the Association who have paid their assessments. Three hundred copies are now on hand to supply other members of such parties as the Association may direct. According to our anticipations the work has been expensive; the trade however ought to derive permanent benefit from the effort. In the future, the maintenance of the system will require a revision and republication of the work at stated intervals, perhaps every five years.

The selection of a name for the new stove is a matter of great interest to the manufacturer, whose aim should be to choose one that would give character to the article instead of detracting from it. A careful reader will find in this name-book a large number of names which convey no impression of character, and some that are very amusing.

#### OUR NOMENCLATURE

needs revision as far as practicable, primarily because many of the names by which the designs or improvements of the manufacturers are known are repeatedly repeated, with only some slight qualification to distinguish them; and, secondly, with a view to doing away with names that are meaningless, inappropriate, grotesque or utterly absurd. Many of the names in use are exceedingly suggestive of a happy-go-lucky way of doing business, and many others are at variance with the serious and oftentimes glowing manner in which the merits of the articles for which they stand are set forth to the public. A glance at the register compiled by the secretary of the Association shows that the manufacturers have drawn upon various departments of human knowledge for their names, or have borrowed from sources which would seem accessible to them alone. It is to be presumed that our more lofty and high-toned manufacturers could only be content to draw upon royalty for their titles, for we have a King, a Queen, an Emperor, an Empress, a Monarch, a Czar, a Crowned Prince and an Autocrat; and we have, too a Prince and a Princess; while one manufacturer was led to consider a Little Queen better than no queen at all. The celestially-inclined have levied tribute on astronomy, and make us familiar with their Rising Sun, and Blazing Star and Silver Moon; others less pretentious appear to be comfortable with a Meteor, a Comet, or even an Asteroid; but one firm could not consent to dwell upon this planet of ours without the sublime benefits of a full Constellation. Then there are those who, we must suppose, feed on ambrosial food; and to them we are indebted for the Arbutus, the Aster, the Daisy, the Eggplant, the Myrtle, the Rose and the Willow; and we contemplate with some awe the grasping disposition which could only rest content with an entire Bouquet. Names are borrowed from the mythologies, and as a result we can boast of Jupiter, Venus, Mercury, Pluto, Juno and Diana; while with the display of gems we are fairly bewildered, being enriched by Diamond, Pearl, Emerald, Opal, Amethyst, Garnet, Ruby, Topaz and Coral, which in turn are supplemented by the Crown Jewel and the Crown Diamond. In a sentimental and social way we have Darling and Lovers' Darling, My Friend and My Mutual Friend, and Belles, Coquettes and a genuine Flirt. Gold is as freely employed as if this was the auriferous age instead of the age of iron; and we have it, from a Gold Mine pure and simple to that thinnest kind of gilt veneering not infrequently implied in the term "golden." Then there is the "Big Bonanza," with its gold and silver products, and by way of humorous antithesis we are supplied with Greenback and a Legal Tender, General Grant, General Scott, Dr. Franklin and others are immortalized; and great altitudes like Alps, Aëna, Andes and Vesuvius tower aloft in the geographical department of our cast iron literature. The forest is taxed for the names we use; and although manufacturers as a class are not given to superlatives, some of them label their goods as Peerless, Perfection, Priceless, Seraphic, Grand, All Right and Bang-up, all of which go to show the shrinking modesty of the members of this Association. We have Darling and Lovers' Darling, My Friend and My Mutual Friend, and Belles, Coquettes and a genuine Flirt. Gold is as freely employed as if this was the auriferous age instead of the age of iron; and we have it, from a Gold Mine pure and simple to that thinnest kind of gilt veneering not infrequently implied in the term "golden." Then there is the "Big Bonanza," with its gold and silver products, and by way of humorous antithesis we are supplied with Greenback and a Legal Tender, General Grant, General Scott, Dr. Franklin and others are immortalized; and great altitudes like Alps, Aëna, Andes and Vesuvius tower aloft in the geographical department of our cast iron literature. The forest is taxed for the names we use; and although manufacturers as a class are not given to superlatives, some of them label their goods as Peerless, Perfection, Priceless, Seraphic, Grand, All Right and Bang-up, all of which go to show the shrinking modesty of the members of this Association.

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#### OUR METHODS OF ADVERTISING

are not exempt from criticism. While I believe that the judicious use of printer's ink is essential to success in business, I have yet to be satisfied that the methods adopted by some are correct. Our advertisement, in whatever form presented to the public, should honestly state our estimate of our wares, and in straightforward and dignified terms. There should be no buffoonery about it; and if we must employ the

pictorial art for purposes of illustration, or to give emphasis to the good points of our manufactures, we should at least reject the tawdry chromos and vulgar caricatures which are now so freely used in the trade. You have all, doubtless, seen the lithographic presentation of a drawing-room in which a lot of badly drawn monkeys figure around the burner whose claims to confidence are supposed to be set forth. The scene is intended to represent the more industrious of the congregation of monks engaged in using the cat's paw with which to pull the chestnuts of the fable out of the fire. Unfortunately for the intended humor, and the truth of history, the chestnuts are deposited on the floor-covering beneath the burner whose windows glow with red paint, and are not anywhere near the fire. Considered as an advertisement of artistic stupidity the picture is all right, but for any other purpose I must regard it as a failure. I recall a little chromo which represents a race track, over which the victorious burner is borne by attenuated legs in 2:14½. Several of the contestants are left some distance behind; others are distanced, and the victor waves aloft a banner with one hand, while the thumb and fingers of the other are piled contemptuously against such a remote semblance of a nose as the artist could safely bestow upon the manufacturer's product. An enterprising patriot has planted his burner in the midst of Arctic snows. Equipped with the stars and stripes, the Equinox are summarily divesting themselves of their furs; the white mountains have been thrown into a comfortable distance, and a more than tropical luxuriance is imparted to the scene by the red and yellow tints of the chromo. A circular of moderate pictorial pretensions sets forth the advantages of the ash-pit, on account of the absence of which Miss Murphy is putting on her gloves and about to take her departure, leaving an innocent family desolate and inconsolable. I think I have in my possession a proof copy of a lithograph representing a parlor scene in which everything is made radiant by the light emitted from the burner in the center of the room. A red belted lion king and his queen sit enthroned, and drink to the health of the general company. A fat porker, arrayed in clerical garb, is as I interpret it, uniting in the bonds of matrimony an attenuated donkey in full dress to a fair young figure, who partially conceals her blushes behind a half opened fan. A gaily dressed cat of the masculine persuasion is leaning upon the floor a slender and elaborately furbelowed grayhound. A lackey, who looks as if he had been graduated at Mr. Darwin's school, a bull-dog carrying a silver and dexter, a plainly dressed, sleek looking bear, with his back to the fire and his paws comfortably lodged under his coat tails, allude to the animation of the scene, while a nondescript animal, unknown to natural history, sits at the piano—a quakerish looking duck in frilled pantalettes standing by the side—and bawls in plaintive tones the touching ballad, "Who will care for winter now?"

It would scarcely be prudent to say how far this sort of advertising helps to attain the object sought to be reached by the advertiser, or how far it falls short of it, not knowing how the manufacturer classifies his patrons or those whose trade he wishes to secure; but, on general principles, I cannot commend it. It may arrest attention by its very absurdity, but that it will win confidence must be seriously doubted. It is scarcely necessary that I should occupy your time with any argument in support of my objections to this expensive and injudicious advertising; and I must be content with submitting my simple protest, with the hope that the dignity of the trade may be preserved and that outrageous names and lithographic clap-trap may cease to require comment or censure.

#### AMENDMENTS TO THE CONSTITUTION.

In the original framing of our constitution and by-laws it was not to be expected that they could be absolutely free from blemish, and it is not surprising that in the actual experience of the organization new points have suggested additional provisions.

Article IV of our Constitution provides for two meetings during the year. The amount of business transacted at our sessions does not warrant two regular meetings. It has been thought by many of our number that the social influence of repeated reunions was an element of strength to us, and I have expressed that as my opinion heretofore. But I am now constrained to believe that the influence of this Association will be fully maintained by appointing one regular time for an annual meeting. Members will then center upon it all their interest and attention, and more will make a determined effort to meet with us regularly. The number of days that would be devoted to such a session would naturally be increased, and so gratify our esteemed friend, Mr. Giles F. Filley, who writes as follows:

"It seems to me it would be a good plan to have our annual or semi-annual meetings extended to three days, instead of two or three. The business could be attended to without the hurry and confusion that has prevailed in our meetings heretofore. It would also enable the members to spend more time in social intercourse with each other."

It should be remembered that in case an emergency arises of vital importance to the Association that the constitution delegates to the Executive Committee the power to call meetings whenever they deem it advisable.

Section 5 of our by-laws provides for an assessment to meet current expenses, but places no restriction upon the amount to be paid during any one year. While it has been our custom to fix the amount of assessments at our winter meetings, and although the demand for money has so far been extremely moderate, yet the by-laws place the power solely in the hands of the committee without a limit. I would therefore suggest an amendment placing some limit to the amount that may be assessed in any one year, only to be exceeded in matters so important as to secure the unanimous vote of the members present at any regular or special meeting of the Association. It may be that such action would remove an objection that might justly deter some from joining our Association.

#### OBITUARIES.

Since our last meeting two of our number have been removed by death from this busy life, and we trust they have been received into a better world beyond the grave.

CHAS. B. REDFIELD, ALBANY, N. Y.  
I am indebted to Mr. John H. Redfield, of Philadelphia, for the following eloquent record of his brother's eventful life:

Charles B. Redfield was the second son of William C. Redfield, well known for his investigations and discoveries in meteorological science, which laid the foundation of our present system of signal service weather reports. He was born at Cromwell, Conn., Nov. 18, 1818, and removed to New York city about 1825, where his father engaged in the business of steam transportation upon the Hudson River. At the age of 16 he found employment with a mercantile house in trade with Buenos Ayres, and subsequently increased his business experience by several years' employment with Thomas Dean, an importer of English muslins, and with Richards & Cronkrite, agents for manufacturers of American cotton fabrics.

About 1845 he removed to Albany, became the chief shipping clerk in the office of the Swiftsure line of freight barges, which his

father had been mainly instrumental in establishing, and a year or two after became one of the principal managers of the line. At that time nearly all the carrying trade between New York and the West was done upon the Hudson River, for the larger part of it being transferred at Albany to and from the boats running upon the Erie Canal. The railroads had as yet not grasped at heavy transportation, nor attempted to control its direction. Hence the position to which Mr. Redfield was now called was one requiring the most untiring industry and most constant diligence, often demanding for months together the labor of 16 or 18 hours per day. Diligently and faithfully for about 20 years he continued to perform those labors, accompanied with heavy financial responsibilities, always faithfully met. At the beginning of 1867 the depression in business which had followed the war of the rebellion, together with the fact that the railroads had obtained entire control of the carrying trade (their mutual competition carrying prices below the possibility of profit), led Mr. Redfield to avail himself of a favorable opportunity to sell out his interest, and he reluctantly abandoned a business which his father had founded 40 years before, and removed his family to Pittsfield, Mass.

Soon after he became associated with the gentlemen who formed the Treadwell Stove Company, and became the secretary and active managing agent of that company. But the times were not then propitious for new enterprises. Various commercial disasters and insufficient capital prevented the success of the undertaking, and in spite of the merits of the company's manufacture and the industry of its managers, the company was compelled to close up its business in 1875.

The labors and cares which Mr. Redfield had sustained so many years with a cheerfulness and courage which were characteristic, no doubt, underlined his constitution. About the 20th of August he was attacked by a disease of the liver, which at first seemed to yield to treatment, but only partially. Hoping to benefit by change of air, he was taken to Kennebunk, Maine. Soon after his arrival there the symptoms became alarming. He sank rapidly, and died on the 26th of September, 1876, leaving a widow and six children to mourn his loss.

I might also speak of his sunny, bright, cheerful and loving, hopeful (perhaps too hopeful) temperament; of his benevolence, private and public; of his usefulness in church and town affairs, especially in the public schools of Pittsfield, in which he was an active, energetic trustee—and of the firm religious principle which controlled him through life and sustained him in death.

MICHAEL M'GARVEY, ALBANY, N. Y.

The firm of Van Wormer & McGarvey was formed in 1847, and, after a prosperous and honorable record, was only dissolved by death. The ties which existed between the members of this firm were peculiarly strong. His partner, in a letter to me, writes: "Personally, I have to say that, during the nearly thirty years' association as partners there never has been a personal difference between us."

Originally a son of toil, possessing no capital other than his own talents, we find him at an early age active in commercial life, steadily advancing in business means and power, and throughout displaying that energy and integrity which is characteristic of a self-made man. His was a proud record, and he loved to refer to it. He never forgot his early days. Nor did he in his great prosperity fail to remember his early associates. He was unostentatious in his liberal charities; he dignified private life, and also stood before the business world conspicuous for his ability and his high sense of commercial honor.

With these few remarks which it has been my privilege to lay before you, and which are the last that I shall have the pleasure of preparing for the consideration of our trade, I desire to express to you my sincere thanks for the uniform courtesy which has been extended toward me. I also desire to assure you that I can never forget the pleasure which I have experienced at our meetings, and hope to enjoy again and again in the future.

Mr. Eddy, (N. Y.)—"It is my duty and privilege to welcome the National Association of Stove Manufacturers to the city of Troy. The attendance is unexpectedly large and affords us much gratification, especially in consideration of the snow blockade and the severity of the winter weather. In the welcome which we extend to you as manufacturers, our citizens and authorities heartily join. The place of meeting has, we think, been well chosen. You return to the old home of the stove trade, as children return to the parental homestead. Many of you, especially those from the West, have outgrown the associations of the trade's early life, but you are none the less welcome, and we trust your visit will be none the less pleasant."

"We are now suffering an extreme and long protracted depression in our business. This is believed by some to arise from our inability as manufacturers to follow the dictates of a wise business policy, and that when we can assert our rights and manage our own business, we shall find relief from many of the evils which now afflict us. Some of us have taken this stand, in opposition to the unreasonable demands and vexatious requirements of the labor unions. Of these I can only say, God bless them, I hope they will stand firm until they have secured for us the independence for which they are struggling."

The election of officers for the ensuing year being next in order, the chair, as directed by vote of the Association, appointed a committee consisting of Messrs. Rathbone, Fuller, Mott, Tefft and Filley, to nominate candidates.

During the deliberations of this committee, a motion was adopted inviting the Mayor of Troy to a seat on the floor during the session of the Association.

Mr. Sard moved that a committee of five be appointed to consider and report upon the several important suggestions and recommendations of the president's address. The chair appointed Messrs. Sard, Whitehead, Burdett, Resor and Hill.

The committee on nominations, having concluded their deliberations, presented the following names, the ticket being a renomination of all the officers of 1876:

President—S. S. Jewett.  
Vice-Presidents—John F. Rathbone, A. E. Chamberlain.  
Treasurer—A. Bradley.  
Secretary—Josiah Jewett.  
Board of Managers—Charles Eddy, J. L. Mott, W. H. Whitehouse, Isaac A. Sheppard, W. L. Wood.

Mr. Jewett expressed his thanks for the compliment of a renomination, but begged that he might be considered not a candidate. Orig-

nally elected to the office at the Chicago meeting two years ago—a meeting which he had been unable to attend—he had accepted the office reluctantly, and with grave doubts as to his fitness for the position. He had hoped to be allowed to retire at the end of the first year, but in deference to the wish of the Association he had accepted a re-election, with the understanding that it was for another year only. His time was so fully occupied with important duties that he would much rather retire from the presidency.

General Rathbone, on behalf of the committee, begged that Mr. Jewett would reconsider his decision. These are perilous times, and Mr. Jewett's large experience and wise judgment are needed to guide the Association for another year at least. He had done much to strengthen the Association, and had filled the office with great ability. They all knew the claims which his large private interests made upon his time, but the best of the world's work is done by busy men. After again begging the president to withdraw his objection General Rathbone called for a rising vote, which, it is needless to say, was unanimous.

Thus urged, Mr. Jewett withdrew his objection, and his consent to receive the nomination was received with great enthusiasm.

There being no opposition ticket the secretary was directed to cast a single ballot for the Association, and the officers re-nominated by the committee were declared elected.

Mr. W. F. Warren invited the Association to meet the Troy manufacturers at 3 p. m. at the Troy Club House. The invitation was accepted.

On motion the Detroit Iron and Brass Manufacturing Company and the Schenectady Stove Company were elected to membership.

Mr. Bradley, treasurer, presented a financial report for the year, which was accepted.

Mr. J. Jewett, secretary, asked to be instructed what disposition to make of the "Name Book." Copies had been sent to all members in good standing, but some 350 copies remained for distribution or sale. Upon motion of Mr. Tefft he was instructed to sell the balance at \$2 per copy.

Letters expressing regret at inability to attend the meeting were read from A. E. Chamberlain, Cincinnati, and I. A. Sheppard, Philadelphia, and spread upon the minutes.

General Rathbone said: "There is a suburb of Troy, about six miles down the river, of which some of you may have heard. It is an old-fashioned place, but has some objects of local interest. Just now the most remarkable of these is the Legislature. In summer we delight to show our visitors the Cemetery, also the Penitentiary. Some people in Albany feel an interest in this Association, and have delegated me to ask you to meet them at dinner at the Delavan at 7 p. m. to-morrow (Thursday)." The invitation was accepted with thanks.

Mr. Tefft reminded the Association that Detroit had for two years been promised a summer visit, and asked that the next meeting be held there in June. A motion to that effect was unanimously carried.

Mr. Eddy offered the following:  
*Resolved*, That this Association establish a bureau, exclusively for the benefit of its members, to determine credits in the manner employed by the commercial agencies.

He said the trade had suffered by incorrect reports made by these agencies, and thought the Association could well afford to take such action.

The resolution was adopted, and the chair appointed the following committee to report a practicable scheme: Messrs. Eddy, Remsen, Tefft and Filley. The president was made a member *ex officio*.

Mr. Merriam considered the subject of credits one of the most important which could be brought before the Association. He had had a somewhat extensive experience in both giving and receiving credit, and if he had the power he would abolish all laws relating to the collection of debts. If a manufacturer was fool enough to part with his goods without either money or security, he should take his own chances of collecting. There was too much effort to sell, and credits should be more carefully scrutinized than they are. It is too much to ask of manufacturers that they shall furnish dealers the capital to do business on. A little help was well enough, but this might be carried a great deal too far. There are plenty of persons in the retail stove trade without a dollar of capital of their own. It was astonishing how so many irresponsible scoundrels could get unlimited credit; and he had even heard manufacturers say that a man who had burst up and failed was a safer man to sell to than one that hadn't. When the stove trade was prosperous, it was on a cash basis. Gradually they had been drawn into giving 30, 60 and 90 days, and then four months; now it is sometimes 12 and 18 months. Some even went so far as to deliver goods to be paid for when sold, without date. He did not know that a credit bureau was the best way to cure the evil, but he hoped that some decided action would be taken by the Association.

General Rathbone said he had been a stove founder for many years, and had watched the growth of the credit system with alarm. He gave many interesting examples of the expedients of dishonest dealers to avoid the payment of their debts, and considered the trade demoralized. Proceedings in bankruptcy were useless, and before beginning them a creditor had better charge the account to profit and loss. It is hard enough to get the cost of making and selling our stoves, without furnishing the capital which enables dishonest bankrupts to continue in business to the disadvantage of their honest neighbors. As merchants we are willing to take the risks of business and all the contingencies of trade, but when we have to meet the fact that a man can, if he will, cheat us out of what he owes us, it is obvious that we must take vigorous measures for our own

protection. For one, he was tired of the struggle, and suggested the appointment of a committee to report an easy and safe way in which a stove manufacturer could get out of the business and realize upon such valuable assets as old flasks, old patterns, &c.

Mr. Spear spoke at length to the same effect.

Mr. Merriam explained the difference between theory and practice in this matter of selling on long credit. All manufacturers realize how foolish it is, but they are subject to influences that often lead them to do unwise things. The small houses must follow the lead of the large ones, and without the help of the latter reform was impossible. There is too much effort on the part of some of these large houses to be extra smart—to overreach everybody else; but they would do well to remember that no one was so smart that all the rest would not be just as smart as he in a very short time.

Mr. Hill thought the question of credit one of the most important that could be brought before the Association. Trade was small, production large and the future dark, and he would be glad of anything that would tend to bring the trade back to a cash basis.

Mr. Sard said the Association had talked this matter over time and again, and had repeatedly resolved to remedy the abuses of the trade. As Mr. Eddy had said, they lacked independence enough to follow their convictions. He had a word to say in favor of travelers. They follow the instructions given them, and are blamed for many things for which those who send them out are responsible.

Mr. Olmaber said this discussion reminded him of an anecdote: A friend of President Lincoln invented a plan of keeping squirrels from eating corn, and wanted to patent it. He would not tell what it was, however, until he found it impossible to obtain a patent without describing the invention. He had noticed that the squirrels always ate the outside rows first; and his system was to so plant the field that there should be no outside rows. He thought that good times would put a stop to the existing troubles, and that until they came it would be as difficult to devise a remedy as to plant a field without outside rows.

Mr. S. S. Jewett told an amusing anecdote: Mr. Sidney Shepard, of Buffalo, once wanted a good cow, and asked a German customer, Cronenberg, by name, living about ten miles out, to find him one. The German undertook the task with great zeal. He found a great many good cows and some extraordinary ones, but always wanted something still better. At last he found another German who had a cow to sell, which he praised very highly. While they were talking, the owner's wife came out and began to cry bitterly, bewailing the prospect of losing so valuable a cow, which gave such floods of milk—all cream. This satisfied Mr. Cronenberg that he had at last found the cow for Mr. Shepard. He did not dare to risk driving her in, so he put her on a sleigh and rode her in state. Mr. Shepard was much pleased and took her home. Some days after, Cronenberg inquired, "How about dot cows, Mr. Shepard?" "Oh, she's all right as a cow," said Mr. Shepard, "but she don't give any milk." Cronenberg was much troubled, and determined to find out what the woman had cried about. So he went to see her, and on inquiring the reason of her great grief, received the reply: "Vell, Mr. Cronenberg, we must do somedings to sell dot cows." So it is with the stove manufacturers. They must do something to sell their stoves, and what they do is very apt to degenerate into abuses.

Mr. Whitehead said that the stove question resolved itself into two problems—converting pig iron into stoves, and converting the stoves into money to buy pig iron. He thought that if principals would give more personal attention to selling, and delegate less authority to employees, it would be better for the interests of the trade. If this was impracticable, those who do the selling should be in some way interested in the profits; at least they should be intelligently informed of the cost of the goods they sell. Stove travelers are a very good class of men, but if we send them out with instructions to sell to the best advantage they can, and give them no information as to the value of the goods, we have only ourselves to blame if they get us into difficulty.

The Association then adjourned until 10:30 a. m. Thursday.

#### THE COLLATION.

At 3 p. m. the members and guests of the Association assembled in the pleasant rooms of the Troy Club, and were hospitably entertained with an elegant collation. Toasts were drunk and speeches made, and the company passed several very pleasant hours in informal social intercourse.

The proceedings of Thursday's meeting, with some account of the banquet at the Delavan House, Albany, in the evening, will be given in our next issue.

At the annual meeting of the American Microscopical Society, of the city of New York, held Tuesday evening, Jan. 9, 1877, the following officers were elected for the ensuing year: President, John B. Rich, M. D., 85 East Tenth street, N. Y.; vice-president, Wm. H. Atkinson, M. D., 41 East Ninth street, N. Y.; secretary, O. G. Mason, Bellevue Hospital, N. Y.; treasurer, T. d'Oremieulx, 7 Winthrop Place, N. Y.; curator, John Frey, Bellevue Hospital, N. Y.

An idea is gaining ground with aeronauts that the solution of the polar problem now rests with them. Captain Cheyne, a retired British naval officer, has volunteered to conduct a balloon party over the 400 miles or thereabout which have not yet been traversed, and the project finds a warm supporter in a Mr. Coxwell, who deems such an expedition quite feasible. The only trouble in the mind of the latter seems to be the supply of gas in the higher latitudes. This, however, he thinks may

be gotten over by the use of fire balloons. He recommends the use of "very large Montgolfiers," in which it would be possible to stow away a couple of sledges with dogs, and "boats fit for contention with a polar sea as a forlorn hope." Four hundred miles, at the average rate of atmospheric speed, would not, in his opinion, occupy 24 hours. Mr. Coxwell's plan is well calculated to startle the uninitiated in aerostatics.

#### Scotch Pig Iron.

In their annual review Messrs. William Colvin & Co. say:

At this time last year the market was buoyant under the influence of a speculative feeling, engendered by sanguine views regarding the prospects for the coming spring. The price on January 1 was 64 1/2, and the advance culminated on the 11th of that month, when 66 1/2 was freely paid for warrants. From this point, the highest of the year, there was a gradual and persistent decline, and, as the farther the season advanced, the foreign demand proved the more disappointing, we reached almost the minimum value for the year without any rally of importance—the price on July 11 being 56 1/2. The market remained very inanimate during the autumn months, the variations in price being from 55 1/2 to 57 1/2. In November, however, the idea began to gain ground that the trade had passed through the worst of the depression, more disposition was shown to hold iron, and by the end of that month the price reached 60 1/2, and has since then fluctuated between that figure and 57 1/2. The production has been well maintained in the face of low and unremunerative prices, and some of the ironmasters have thought it better policy to stock their surplus iron and wait for better times than curtail their make and thereby enhance the cost of production. The shipments show a marked falling off, and are smaller, with the exception of 1874, than any year since 1853. The depression in the iron trade has been general over the whole world, and the make has been curtailed and stocks reduced in almost every quarter. This state of matters abroad will bring Scotch iron into prominent notice as soon as trade begins to acquire its accustomed volume. The same firm give the following useful

#### Comparative Statement.

	1874.	1875.	1876.
Annual production.....	806,000	1,050,000	1,103,000
Foreign shipments.....	296,803	368,433	353,572
Coastwise.....	166,104	174,056	166,190
Total shipments for the year.....	462,907	542,500	469,642
Consumption in Scotland.....	317,000	360,000	370,660
Stocks, Dec. 31.....	96,000	170,000	363,000
Av. no. of furnaces in blast.....	96	117	116
Furnaces in blast Dec. 31.....	121	113	116
Av. no. of blast Dec. 31.....	55.9	58.6	58.6
Price Dec. 31.....	76/	64/6	58/
Bank rt. of dis. Dec. 31.....	6/	3/	3/
Make of malleable iron.....	180,000	196,000	230,000
Av. price of bars for the year.....	£10. 15/	£8. 15/	£7. 15/
Imp. of English pig iron.....	200,000	220,000	235,000

Messrs. James Watson & Co.'s annual report is as under:

The expectation of a revival in trade, which marked the close of 1875, has not been realized during the past year. Local consumption in both foundries and malleable works has increased, but the shipping demand has been small, and the returns show a heavy decrease. The market opened on the 4th of January at 64 1/2, but quickly advanced, until a week later 66 1/2 was attained, being the highest price of the year. From this figure the market, with minor fluctuations, gradually receded until on the 25th of August 55 1/2, the lowest point of the year, was touched. For a short time the market was steady about this price, but toward the end of September extensive buying commenced, which, supported by advances in makers' iron, sent warrants to 60 on the 23d of November. The latter figure, however, was not maintained, and the tone has since been quiet, closing Dec. 29 with buyers at 57 1/2, cash. The average price for the year has been 58 1/2. During the year there have been produced 1,103,000 tons, by an average of 116 furnaces, being an increase over 1875 of 53,000 tons. As will be seen, this increase has been gained with a loss in blast, and is the result of improved furnaces, and the steady manner in which the miners have wrought. Wages have averaged about 4/6 per ton. There have been shipped foreign 368,433 tons, against 368,433 tons in 1875 and 296,803 tons in 1874, of which France has taken 28,722 tons, against 32,927 tons in 1875 and 25,808 tons in 1874; Germany, Austria and Holland have taken 162,547 tons, against 185,260 tons in 1875 and 130,983 tons in 1874; Belgium, Denmark, Sweden and Norway have taken 24,179 tons, against 31,387 tons in 1875, and 32,319 tons in 1874; Russia has taken 14,636 tons, against 23,435 tons in 1875 and 23,295 tons in 1874; Spain and Portugal have taken 12,108 tons, against 12,588 tons in 1875 and 8830 tons in 1874; Italy has taken 20,784 tons, against 19,510 tons in 1875 and 19,030 tons in 1874; United States has taken 36,445 tons, against 44,107 tons in 1875 and 36,467 tons in 1874; British America has taken 30,488 tons, against 30,384 tons in 1875 and 20,384 tons in 1874; East Indies, China, Australia, South America, &c., have taken 10,339 tons, against 22,953 tons in 1875 and 16,227 tons in 1874. The falling off in exports has principally been in foreign shipments. There has been consumed locally 370,000 tons Scotch and 285,000 tons English pig iron, being an increase in the former of 10,000 tons and in the latter of 65,000 tons; of this foundries have taken 195,000 tons Scotch and 300,000 tons English, as against 205,000 tons Scotch and 154,000 tons English in 1875; malleable works have taken 175,000 tons Scotch and 85,000 tons English, as against 152,000 tons Scotch and 66,000 tons English in 1875, showing a total increase of 36,000 tons for foundries and 39,000 tons for malleable works. The quantity of malleable iron produced being 230,000 as compared with 196,000 tons in 1875. As will be noted, the increase in the consumption consists largely of English iron. The shipbuilding trade has been quiet during the past year, but shows some signs of improvement; while the number of vessels now building is about the same as last year, the gross tonnage is 20,000 tons more. There were built in 1876 about 243 iron vessels of about 200,000 tons, against 263 of 231,662 tons in 1875, and 204 of 204,010 tons in 1874. And there are now building 146 iron vessels of about 152,745 tons, against 144 of 132,280 tons in 1875, and 170 of 132,443 tons in 1874. The following are the prices now current for No. 1 shipping brands, compared with those ruling at this date last year:

	1876.	1875.
Gart-sherrill.....	65/	75/
Coldness.....	70/	79/
Summerlee.....	64/	71/
Caldar.....	65/6	76/
Langdon.....	66/	75/
Cambridge.....	60/	67/
Shotts.....	65/	74/
Carron.....	72/6	70/
Clyde.....	59/6	66/
Govan.....	59/	66/
Monkland.....	58/	66/
Glengarnock.....	63/6	76/
Eglinton.....	60/	65/
Delamington.....	59/6	65/
Kinnell.....	60/	66/
Almond.....	67/6	66/

Messrs. Watson & Co. append statistics, from which we condense the following:

	1873.	1874.	1875.	1876.	1877.
Stock January 1.....	194m	180m	96m	170m	363m
Shipments.....	612m	463m	543m	470m	469m
Make.....	989m	806m	1050m	1103m	1103m
Furnaces in blast Jan. 1.....	115	132	121	113	116
Av. no. of blast Dec. 31.....	55.9	58.6	58.6	58.6	58.6
Consump. in Scotland.....	317m	317m	360m	370m	370m
Average price.....	117/3	87/6	63/9	58/6	58/6
Furnaces in blast.....	119	96	117	116	116
Miners' wages.....	8/6	6/6	5/	4/6	4/6
Bank of England rate of discount.....	5	3 1/2	3 1/2	2 1/2	2 1/2

Messrs. Swan give a handy table, showing production, consumption, exports and stocks, from Dec. 25, 1875, to Dec. 25, 1876, which they say is published by authority of the committee of the Glasgow Association of Iron Merchants and Brokers, thus:

	1876.	1875.	1876.
Tons.	Tons.	Inc.	Dec.
Production.....	1,103,000	1,050,000	53,000
From the makers.....	1,103,000	1,050,000	53,000
Consumption.....	195,000	208,000	13,000
In foundries.....	195,000	208,000	13,000
In malleable works.....	175,000	185,000	10,000
Quantity of bar iron made: 1876.....	230,000	1875.....	196,000
Exports.....	368,433	368,433	174,056
Coastwise.....	166,190	174,056	166,190
By rail to England.....	70,088	73,491	70,088
Stocks.....	540,000	616,000	76,000
In Connal & Co.'s stores at Glasgow.....	107,798	63,299	107,798
At makers' works from returns received from them.....	255,202	106,701	255,202
.....	363,000	170,000	193,000

#### American Machinery in England.—

Mr. W. H. Bailey, in a communication to the *Manchester Examiner*, says: "The Americans sell machinery better than we in England do. If they make a good tool or implement they introduce it with great ability to the man who wants or is likely to want it. A few years ago it was considered *infra dig.* for a large engineering firm to advertise or publish circulars, and it has been said of a late firm of this city that orders were only received on Wednesdays from 11 to 1. When the Americans have a good thing to sell they let everybody know it; they have their machine merchants, and devote far more attention than we do to the discovery of a customer. The books of their mechanical tool makers are wonderful productions, and their catalogue literature I have not seen at all equalled by the tool makers of this country. Allow me to give one illustration of the advantages the Americans derive from their system of advertising. I know a man near Oldham who will make a small hand drilling machine for £5, and who sells a few occasionally. The same thing, only very much lighter, is made in the United States; it comes here heralded by an illustrated circular, a man is appointed who earns a living by selling such things, and in consequence of superior commercial enterprise the American one sells at \$6. 10/. The American tools which are being sold in this country are dear; some of them are very good and many are worthless scrap, but all dear, and yet they sell well. It has filled me with astonishment to see lathes, drilling machines, chucks, slide rests and other goods command high prices, simply because the Americans take the trouble to let people know what they have to sell, nicely illustrate it and carefully give dimensions and prices. If you want to buy similar goods from English tool makers I can name, it takes as much trouble to get at prices and particulars as it does to extract an ancient tooth."

The burning of the Brooklyn Theater was horrible; the fall of the Ashabula bridge was horrible; but the horror of horrors that stands without parallel in the annals of mankind was the recent cyclone and storm wave in India. About a quarter of a million souls were suddenly swept into eternity. The plague of London and the destruction of Lisbon by an earthquake shrink into insignificance before this appalling catastrophe. The *Dombay Gazette*, of Nov. 30, gives some of the details of the awful event. On the fatal night, Oct. 31, there were no extraordinary portents of the approach of the storm. The weather had been hazy, windy and hot. At 11 o'clock the wind freshened. Suddenly about midnight a mighty wave was seen, and the next instant houses and those who were sleeping therein were swept away by the flood. When the sun rose it shone upon a desolate country and a shivering terror-stricken band of survivors, who were not able to realize what kind of calamity it was that had overwhelmed them so mysteriously in the darkness.

Nickelizing, which to some extent has replaced silvering, may be itself replaced for many articles of small value, particularly if they contain copper. The manipulation is quite simple. Coarse rasped or granulated zinc is boiled for some time in a mixture of three parts by weight of sal-ammoniac and ten of water, the objects immersed and stirred up with a zinc rod. The deposit is silvery bright, and resists mechanical action as successfully as a coating of nickel.

Dr. Walker Hempel, of Germany, suggests, as a means of quickening the action of the filter pump, that a series of five radial lines be etched in the funnel below the top of the filter to the neck. By this system of little canals the action of the apparatus is claimed to be considerably accelerated.

It is a noticeable fact that the industries having a good export trade are now the busiest. Among manufacturers of agricultural implements, rifles, and hardware there is a degree of activity in marked contrast with the dullness which prevails among blast furnaces. The cotton exportation is extending to all parts of the world, including India, an old market of American cotton, Africa, and South American countries, and it is growing rapidly. From New York there were exported in 1876 as many as 74,456 packages, against 41,003 in 1875, the average of the five preceding years being 16,581 packages. Boston is also exporting freely. The result is that the cotton mills have received a wonderful jog, and some few of those in New England were, in December, obliged to run on extra time. Exportation of leather goods is increasing, and that of leather, a new feature, is now marked. The business has been stimulated, and idle factories of boots and shoes are starting up in consequence of contracts for the foreign trade. The paper manufacturers are also doing well. He is a dull mill owner who cannot read the lesson this teaches.

One of the German dynamite manufactories has lately been producing a cheap sort of dynamite which is called pantopolite, the peculiarity of which resides in the fact that it contains a small percentage of naphthaline, dissolved in the nitro-glycerine. The purpose of this addition is stated to be in order to prevent the formation of the disagreeable nitrous vapors during explosions. The results of practical tests with the material seem to have been quite unsatisfactory.

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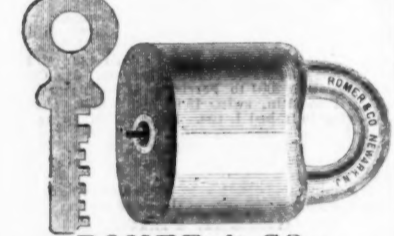
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**PASSENGER CAR LOCKS,**

Bronzed, Nickel-Plated and Japanned.

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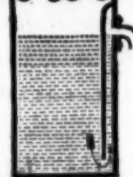


Are made of best steel on scientific principles. Light, practical, durable, cheap. Has no competitor for public favor, as thousands can testify. See same in Agricultural Hall, Centennial, Philadelphia, Column T, No. 25. Orders for full trade should be made early. Manufactured only in this city. Send for circular and price list.

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ROCHESTER, N. Y.

**CARSON'S PATENT KITCHEN SINK.**

"The Kitchen Sink heads the list by which people violate the universal Sanitary Law," G. E. Waring, Jr.



Cleanliness pays Dividends in Health. Economy is the royal road to Wealth.

The above Cut represents the CARSON SINK, an Article which combines Two very important features in Domestic Economy. It prevents the pipe from choking and at the same time furnishes grease enough to make soap for the Family and is perfectly odorless. Health and Economy are its main features of excellence. Send for Circular and Prices. J. M. CARSON & Co., 175 W. Main St. Louisville, Ky.

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Manufacturers of

**IMPROVED**  
**Gimlet Pointed Wood Screws,**  
**Patented**

May 30,

**1876.**

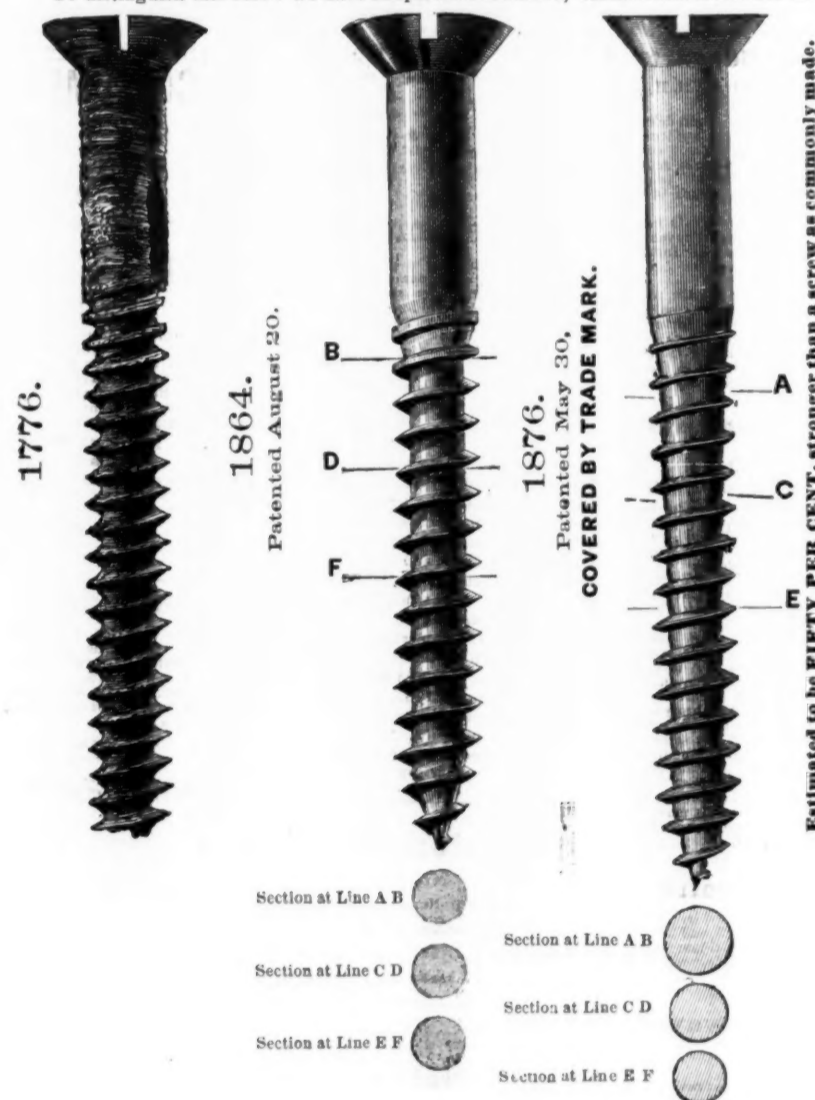


After forty years' experience we offer to the trade our Centennial Screw, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery, as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored boxes with new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of screw making from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

**CLAIM.**

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

**Canceling Postage Stamps.**

In an article upon the subject of canceling postage stamps, the *World* has some very interesting items concerning the very reckless manner in which inventors set themselves to work upon problems:

Every year, in something over 30,000 offices, the Post Office Department cancels a thousand million postal stamps of one sort and another. It was really a little more than this last year—1,049,797,507—but a few thousand more or less make small difference. The thousand million give work enough. One-third the stamped envelopes and the postal cards cancel themselves, in a sense. No one can use them twice. The stamps nobody has yet been able to cancel fairly and completely, and within the past month the department closed two years of experiment no wiser than it began. No one has got past the pad, the stamp, and the printers' ink with which the department began 30 years ago, and which it uses still. Down in one corner of the Post Office building there is a room full of some four hundred or five hundred fruitless inventions.

A new ink is generally the stronghold of canceling genius, and to the fat inks—printers'—and metallic inks—writing fluid—the three principal acids, caustic potash and a drug-shop of other chemicals have been added by genius at work on a letter-stamp. There is a sulphuric acid ink there which came from Cincinnati, warranted to cancel a stamp, and which eats a hole through the envelope into the bargain. There is one of caustic potash, backed by a distinguished chemist, which blisters a man's fingers at touch and has its effects on the glass bottle which holds it. Nitric acid is at the bottom of another ink, and fills the air as it is used with the fumes familiar to laboratories. All these inks do too much. Most of them do too little. Your average inventor never tests his invention. A shelf full of inks—warranted to stand acids—have been washed clean and dry from canceled stamps with ordinary soap at the wash-stand in the corner. One such ink a man brought a precious bottle of from St. Louis. Was doubtful about trusting the bottle out of sight, for fear of losing his "secret." Saw some stamps canceled with it in his sight by Mr. Hazen, in charge, and saw the stamps washed clean ten minutes after with soap and water. Of the whole bottled array of inks not one has stood the acids and the alkalies of the Patent Office chemist. Last on the list is his ink; a Smithsonian chemist settled him, and the department still uses printers' ink of the best quality. No one improves on that.

There are other ways to cancel stamps by genuine *cancelles*. They have all been invented—a good many separate times. People in small offices have invented hooks to harrow the surface of the stamp. That takes too much time. In a large office a single motion from pad to letter must dispose of stamp and post-mark. Men with a vague idea of this have put together an elastic stamp which jabs a stamp full of holes. A little steam and a flat iron smooths that. And there is one ingenious contrivance which brings a disc down with a half-turn at the stamping—a slanting slot does the work—and rips half the features off G. W. or Franklin. Somewhere along the ten-thousandth letter this dills and takes a blow like a sledge hammer to do its work. The New York office cancels 200,000,000 stamps a year, and the New York clerk takes more kindly to the firm, light tap of a wooden stamp. No invention has displaced that any more than the ink.

So the department has given over the attempt to cancel. Gets three cents for a good many stamps, and carries six or nine cents mail matter under the stamp. It is not a profitable operation? "Do they have this bother in England?" I asked. "Oh, no; they black their stamps up so thoroughly." "Why can't we?" "Well, our postmasters are not so careful, and in England they make a row with a man if a stamp is not properly canceled. We can't do that. The department doesn't have enough control, and can't get at a man so sharply." "Then this whole loss is simply a question of civil service, efficient or not?" "Well, yes; about that."

**The Richmond Fire—Baeder & Adamson's Loss.**—At midnight, on Saturday, a fire broke out in the fertilizing department of Baeder & Adamson's Glue Works at Allegheny avenue and Richmond street, in Richmond. The flames originated in the extractor house, a two-story frame building, 70 feet long by 60 wide, in which the process of making neat-foot oil is carried on, and communicated with great rapidity to a four-story frame building, 200 by 60 feet, used as a storehouse for fertilizing matter. These structures were destroyed. During the fire a benzine boiler 50 feet long exploded, and the liquid was thrown upon the ice in the Delaware, where it burned for some time. Fortunately the buildings burned were some distance from the manufactory, and the loss was thereby kept within \$20,000. The insurances are on the second building burned, the structure in which the flames originated being uninsured.

In the course of his recent experiments with an electro-magnetic machine of the gramme pattern, Professor W. A. Anthony made the following observations: "The electric machine was driven by a 5 horse Brayton petroleum oil engine. The engine consumed a little over 6 1/4 pounds of crude petroleum per hour. The lamp used in the engine, by which the explosive mixture is fired, had a 1 inch flat wick, and consumed 29.8 grammes (459 grains) of oil per hour. The power resulting from the motion of the engine, when applied to the electric machine, produced a stream of electricity or electric light, having an illuminating power equal to that of 234 of the lamps mentioned, showing that three times more light may be produced from a given quantity of oil."

John Rowe.

The death of John Rowe, a prominent member of the firm of Woodrough & McParlin, Cincinnati, Ohio, occurred at his home in Columbia on the 16th instant. Mr. Rowe was a native of Prince Edward's Island. At an early age he came to this country, locating in Boston, Mass., where he learned the trade of saw maker. He moved to Cincinnati in 1857, and in 1863 associated himself in partnership, in that city, with G. G. Tench, under the style of Rowe & Tench, saw manufacturers. In this, as in all of his business undertakings, he was eminently successful, and in 1867, having realized sufficient means to undertake larger operations, he accepted a partnership in the older firm of Woodrough & McParlin. The memory of John Rowe will not soon be forgotten by those who came in contact with him. He was warm hearted and generous in disposition, modest and unassuming in manner, straight-forward and honorable in his dealings. As a mechanic he was an enthusiast in his business, persevering, industrious, and a thorough master of his trade. At the time of his death he was about 42 years of age.

It is a curious commentary on the progress of science that the most unscientifically constructed houses in Paris and London are those in which the leaders of science carry on their deliberations. The hall in which the Paris Academy of Sciences meets is so badly ventilated that when the windows are closed the members are stifled with heat and foul air, while, as usual, many of them have a dread of open windows. Mr. Leverrier declared a short time ago that the only other apartment in France which was so intolerable was the Hall of the Institute.

## Special Notices.

Office of  
**The Table Cutlery Manufacturers' Association,**  
Of the United States, comprising:

BEAVER FALLS CUTLERY CO.,  
LANDERS, FRARY & CLARK,  
JOHN RUSSELL CUTLERY CO.,  
MERIDEN CUTLERY CO.,  
CHICAGO CUTLERY MFG. CO.,  
LAWSON & GORDON MFG. CO.

TO THE TRADE: With a view of reducing the excessive number of Patterns of Table Cutlery, the members of this Association will offer at Auction, through

Messrs. Bissell, Welles & Millet,  
No. 15 Murray Street, New York, their entire stock of Discarded Patterns, which will include all goods not regularly classified and priced by the Association, to which the attention of buyers is solicited. All goods offered by us will be "FIRST QUALITY."  
By order of the Association,  
P. N. OAKMAN, Jr., } Exec. Committee,  
J. B. BIDDLE, }  
C. S. LANDERS, }

N. Y., January 17th, 1877.

GENTLEMEN: Referring to above Circular of the Cutlery Association, we hereby announce to the Trade that we shall offer at Auction, at our Salesroom, No. 15 Murray Street, on

**Tuesday and Wednesday, Feb. 13th & 14th, at 10 o'clock a. m., for Cash,**  
over \$40,000 worth of first quality Table Cutlery, Carvers, Butcher Knives, &c., being the production of the above leading manufacturers, and comprising from 3000 to 4000 gross Table Cutlery, together with a large line of Carvers and Butcher Knives. This sale will be peremptory, and the entire quantity sold, as the patterns offered by us are to be withdrawn from the market. This sale will be made in lots to suit large and small buyers, and the well known character of the manufacturers is a guarantee of the quality of the goods. The variety of styles and patterns will be such as to meet the demands of the trade of all sections, and the sale will be in every respect worthy of your attendance.

Also, in addition to above, we will offer a large and attractive line of new Razors, Razors, Scissors, Plated Spoons and Forks, &c., &c.

We would also notify the Trade that we will continue the sale on Thursday and Friday, Feb. 15th and 16th, when we will offer a large line of Heavy and Shell Hardware direct from manufacturers, particulars of which will be given in *The Iron Age* hereafter. Manufacturers who may desire to avail themselves of this opportunity will please forward their invoices early.

Catalogues will be ready on Tuesday, Feb. 6th.  
**BISSELL, WELLES & MILLET,**  
Auctioneers,  
No. 15 Murray St., New York.

TO PERSONS AT PRESENT ENGAGED IN A Traveling Commission Business among Hardware Dealers and Manufacturers, a good opportunity is offered to sell with their other goods an article of Hardware on commission which should be remunerative for the amount of labor expended.

Persons answering this advertisement will please write, giving references, to  
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**RESIDENT BUYER.**—A gentleman of more than twelve years' experience in the general hardware business, and for several years past acting as buyer of the entire stock of one of our large Eastern wholesale houses, will make arrangements to act as buyer for a few Western or Southern correspondents. Thoroughly understands the requirements of both markets, and being constantly in communication with all Eastern manufacturers, offers his services in this behalf. Best of references furnished. Address  
G. T. S.,  
P. O. Box 4743, New York City.

## NOTICE.

The public are cautioned against constructing, selling or using any Screw Machinery employing the inventions or improvements described in the following Letters Patent of the United States:

Letters Patent No. 42,756, for improvements in machinery for nicking the heads of wood screws, granted to H. A. Harvey, May 17th, 1864.

Letters Patent No. 42,756, for improvement in machinery or cutting thread upon wood and other screws, granted to H. A. Harvey, May 17th, 1864.

AMERICAN SCREW CO.

I am prepared to make arrangements with Eastern manufacturers to act as their agent for the sale of Hardware, etc., on the Pacific Coast.

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Any of the following books will be sent, postpaid, upon receipt of price, by

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See *The Iron Age* of Sept. 7, 1876.

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# Trade Report.

Office of THE IRON AGE,  
WEDNESDAY EVENING, Jan. 24, 1877.

During the past week a feeling of greater confidence has gained ground in business circles. The prospect of an amicable and satisfactory settlement of the presidential election is considered good, while the situation in the East is decidedly warlike. With peace at home and war abroad it will not be long before trade revives and industry is stimulated. The money market has worked steadily toward greater ease, call loans ranging 4 @ 5 per cent., and prime mercantile paper 4 1/2 @ 6 per cent.

The gold market has been steady between 106 and 106 1/2. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday.....	106 1/2	106 1/2
Friday.....	106 1/2	106 1/2
Saturday.....	106 1/2	106 1/2
Sunday.....	106 1/2	106 1/2
Tuesday.....	106 1/2	106 1/2
Wednesday.....	106 1/2	106 1/2

The market for government bonds has been active and strong; state bonds have been dull; railroad bonds strong with an upward tendency. We give below the closing quotations of governments.

The stock market has been generally strong, with principal dealings in Western Union and Lake Shore. We give below the closing quotations of active shares.

The bank statement shows a rise in the legal tender average of \$3,085,900; the specie average is also \$1,237,500 higher and the banks still hold more specie than they do legal tender notes. The total reserve is \$4,323,400 higher than last week; the increase in the surplus reserve is less because reduced by the allowance made for the increase in liabilities. The surplus reserve, however, is up to \$24,268,000, against \$20,813,225 last week. The following is a comparison of the bank averages for the past two weeks:

	Jan. 13.	Jan. 20.	Difference.
Loans.....	\$254,173,400	\$252,411,900	Dec. \$1,761,500
Specie.....	39,737,400	40,974,900	Inc. 1,237,500
Legal tenders.....	37,042,900	40,128,800	Inc. 3,085,900
Deposits.....	223,868,300	227,342,800	Inc. 3,474,500
Circulation.....	15,517,300	15,491,900	Dec. 25,400

The foreign trade movements for the week are shown by the following tables:

IMPORTS.			
For the week ended Jan. 20.			
	1875.	1876.	1877.
Total for week.....	\$6,079,348	\$5,876,576	\$5,196,030
Prev. reported.....	13,008,536	16,417,539	12,435,081

Since Jan. 1..... \$19,087,884 \$22,294,115 \$17,441,061

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Arvills.....	116	\$854
Brass goods.....	21	3,338
Chains and Anchors.....	201	5,627
Copper.....	77	1,998
Cutlery.....	42	2,903
Guns.....	72	2,068
Hardware.....	81	9,999
Iron, pig, tons.....	19	1,890
Iron, sheet, tons.....	19	1,890
Iron, coil, tons.....	19	1,890
Iron, other, tons.....	19	1,890
Metal goods.....	162	25,424
Needles.....	22	9,208
Old metal.....	1	943
Per caps.....	1	101
Saddlery.....	1	101
Steel.....	1,524	18,052
Silverware.....	5	114
Tin, boxes.....	171	106,247
Tin, 1,388 slabs.....	160,029	36,286
Wire.....	5	1,478

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended Jan. 23:

	1875.	1876.	1877.
For the week.....	\$3,611,472	\$5,670,726	\$6,379,186
Previously reported.....	13,132,930	14,231,815	17,438,316

Since Jan. 1..... \$16,744,402 \$19,902,541 \$23,813,502

EXPORTS OF SPECIE.

For the week ended Jan. 20:

	1875.	1876.	1877.
Total for week.....	\$308,224	\$308,224	\$308,224
Previously reported.....	420,404	420,404	420,404

Same time in 1876..... \$238,623

Same time in 1875..... \$238,623

Same time in 1874..... \$238,623

Same time in 1873..... \$238,623

Same time in 1872..... \$238,623

Same time in 1871..... \$238,623

Same time in 1870..... \$238,623

Same time in 1869..... \$238,623

Same time in 1868..... \$238,623

Same time in 1867..... \$238,623

Same time in 1866..... \$238,623

Same time in 1865..... \$238,623

Same time in 1864..... \$238,623

Same time in 1863..... \$238,623

Same time in 1862..... \$238,623

Same time in 1861..... \$238,623

Same time in 1860..... \$238,623

Same time in 1859..... \$238,623

Same time in 1858..... \$238,623

Same time in 1857..... \$238,623

Same time in 1856..... \$238,623

Same time in 1855..... \$238,623

Same time in 1854..... \$238,623

Same time in 1853..... \$238,623

Same time in 1852..... \$238,623

Same time in 1851..... \$238,623

Same time in 1850..... \$238,623

Same time in 1849..... \$238,623

Same time in 1848..... \$238,623

Same time in 1847..... \$238,623

Same time in 1846..... \$238,623

Same time in 1845..... \$238,623

Same time in 1844..... \$238,623

Same time in 1843..... \$238,623

Same time in 1842..... \$238,623

Same time in 1841..... \$238,623

Same time in 1840..... \$238,623

Same time in 1839..... \$238,623

## GENERAL HARDWARE.

There is little if any difference to notice in the condition of the trade this week compared with last, and the changes in values which have occurred are not of great importance. The failure of Linforth, Kellogg & Co., of San Francisco, Cal., is announced.

The demand for Nails continues light and unsatisfactory at unchanged figures. We quote as before: 10d. to 60d., \$3-00, net, with the usual allowance of 10 cents per keg on orders of 100 kegs and over.

At a recent meeting of the Western Nail Association, the following standard card was adopted. It differs but little from the cards heretofore published by the Nail manufacturers in the West, but its adoption makes it binding on the members of the Association, and obligatory in sales made in the West. In selling they sell by the Eastern card. The most important change is the charge of 10c. extra for each half keg.

Standard Card of the Western Nail Association, adopted January 10, 1877.

Nails, Fence and Brads.

10d to 60d..... \$2-85 8d to 9d..... \$3-10  
5d to 7d..... \$3-25 4d to 6d..... \$3-60  
3d..... \$4-35 2d..... \$5-90

Barrel.  
1/2 inch..... \$6-90 1/4 inch..... \$5-85  
1 inch..... \$5-35 1 1/2 inch..... \$4-90  
1 1/2 inch..... \$4-35 2 inch..... \$3-60  
2 inch..... \$3-60 2 1/2 inch..... \$3-60

Lining.  
1/2 inch..... \$7-35 1/4 inch..... \$6-85  
1 inch..... \$6-35 1 1/2 inch..... \$5-85  
1 1/2 inch..... \$5-35 2 inch..... \$4-90  
2 inch..... \$4-90 2 1/2 inch..... \$4-90  
2 1/2 inch..... \$4-90 3 inch..... \$4-90

Finishing.  
1 inch..... \$7-85 1 1/2 inch..... \$6-85  
1 1/2 inch..... \$6-35 2 inch..... \$5-85  
2 inch..... \$5-35 2 1/2 inch..... \$4-90  
2 1/2 inch..... \$4-90 3 inch..... \$4-90

Casing and Box.  
10d to 30d..... \$3-60 8d..... \$3-85  
6d..... \$4-10 4d..... \$4-35  
3d..... \$5-35 2d..... \$5-90

Fine Blued.  
4d..... \$4-90 3d..... \$5-85  
2d..... \$6-60 1d..... \$6-60

Cut Spikes.  
All sizes..... \$3-10

Boat Spikes.  
All sizes..... \$3-60

Each half keg 10 cents extra.

The Stanley Rule and Level Co. have issued a new catalogue of their goods. In introducing it to the notice of the Hardware trade, they say: "Such changes have been made in prices as improvements in our facilities for producing goods warrant; and new Tools have been added to complete the assortment necessary to meet the fullest requirements of dealers in our line of goods. We aim to secure for our goods the best practical qualities, and the highest standard of style and finish; and we ask for them the closest scrutiny and comparison. The goods themselves shall be their own best recommendation."

A notable feature in this new catalogue is the further reduction in the prices of Bailey's Patent Adjustable Planes, and the introduction of a new line of Planes, to be known in market as the Stanley Adjustable Planes. Of this latter line the Metallic Planes have a Wrought Steel Stock, and both these and the Wood Planes are adjusted by a compound lever, which for simplicity and certainty of action cannot be surpassed. These Planes are offered at prices which place them in the reach of every workman using such tools. The entire catalogue is fully illustrated, and an edition has been printed on extra thin paper, with reference to foreign circulation. We print below their price list for the new line of goods mentioned above, which is subject to same discount as the Bailey Patent Adjustable Planes.

The Stanley Adjustable Planes.

No. 104, Smooth Plane, 9 inches in length, 2 1/2 inch in Cut..... \$3-00

No. 105, Jack Plane, 14 inches in length, 2 1/2 inch in Cut..... \$3-50

The Stanley Plane Irons are the same prices as the Bailey Irons.

The Stanley Iron Block Planes.

No. 110, Block Plane, 7 1/2 inches in length, 1 1/2 inch in Cut..... \$0-70

No. 120, Block Plane, Adjustable, 7 1/2 inches in length, 1 1/2 inch in Cut..... 1-00

Wood Planes.

No. 122, Smooth Plane, 8 inches in length, 1 1/2 inch in Cut..... 1-50

No. 133, Hand Smooth, 10 inches in length, 2 1/2 inch in Cut..... 2-00

No. 121, Jack Plane, 15 inches in length, 2 1/2 inch in Cut..... 2-00

No. 129, Fore Plane, 30 inches in length, 2 1/2 inch in Cut..... 2-85

No. 132, Jointer Plane, 20 inches in length, 2 1/2 inch in Cut..... 3-75

The Washburn & Moen Mfg. Co., Worcester, Mass., and No. 42 Cliff street, have added to their business the manufacture of the Lenox Improved Wire Bale Ties, formerly manufactured by E. S. Lenox. They have issued the following list for these Ties, the regular discount from which is for Extra, 30 per cent.; Medium and Large, 25 per cent. These Ties are made of steel wire, and are suitable for baling hay, straw, moss or other material. They also manufacture the Cross Head and Figure Four Ties, which are sold at the same list and discounts.

Lenox Improved Wire Bale Tie.

Prices per Bundle.

Extra. Medium. Large.

250 ties in each bundle. 250 ties in each bundle. 250 ties in each bundle.

6 feet..... \$4-34 \$5-09 \$4-20

6 " 3 in..... \$4-49 \$5-26 \$4-35

We invite the attention of the trade to the important announcement by Bissell, Welles & Millet, which will be found among "Special Notices" on the opposite page. They will sell by auction at their ware-rooms, No. 15 Murray street, on Tuesday and Wednesday, Feb. 13 and 14, commencing at 10-30 a. m., the entire stock of discarded patterns held by the different manufacturers comprising the Table Cutlery Mfrs. Association, viz.: Beaver Falls Cutlery Co., Landers, Frary & Clark, John Russell Cutlery Co., Meriden Cutlery Co., Chicago Cutlery Mfg. Co., and Lamson and Goodnow Mfg. Co. The stock to be sold, in value about \$40,000, includes beside Carvers, Butcher Knives, &c., from 3000 to 4000 gross Table Cutlery. This sale will be peremptory, and will be made in lots to suit large or small buyers. In addition to the above, Bissell, Welles & Millet will offer a large line of Pocket Cutlery, Razors, Scissors, &c., and on Thursday and Friday, 15th and 16th prox., they will continue the sale, offering a large line of Heavy and Shelf Hardware direct from manufacturers.

The National Horse Nail Co., Vergennes, Vt., have established their agency in this city with Horace Durrie & Co., No. 97 Chambers street, who are prepared to fill orders either from store or factory, at the manufacturers' best terms. The Nails made by this company are of the best Norway Iron, and they guarantee them equal to any similar goods in the market. They are made both bright and blued, pointed and finished. This company was established about seven years ago, and we are informed that their business has steadily increased year by year. They have enlarged their facilities for the production of these goods for the season of 1877. For prices of these Horse Nails we refer our readers to our price current on the 30th page.

The American Lock Mfg. Co., of Cazenovia, N. Y., have issued the following circular under date of last list:

CAZENOVIA, N. Y., Jan. 1, 1877.

GENTLEMEN.—We have effected an arrangement with the Union Nut Company, of 99 Chambers street, New York, to act as our general agents for the sale of the Locks manufactured by us. In requesting you to send your orders in future to them, we desire to call your attention particularly to the superiority of our Locks and trust your sales of them may be largely increased. All orders sent to them will be promptly and satisfactorily filled.

Respectfully, yours,  
AMERICAN LOCK MFG. CO.

Krauss & Hahn, concave, No. 41 Chatham street, inform us that some person has been visiting manufacturers and dealers in Cutlery, endeavoring by the use of their name to procure goods. In some instances he has succeeded. They desire to caution the trade in the matter and say that when their purchases are not made by a member of their firm personally, their written order on a printed form is invariably sent.

The firm of Clark, Smith & Co., Fort Plain, N. Y., proprietors of the Fort Plain Spring and Axle Works, is dissolved by the withdrawal of Wm. Clark. The business will be continued by the remaining partners under the firm name of Wood, Smith & Co.

The Middletown Tool Co., Middletown, Conn., have issued a four page appendix to their catalogue of 1875-76, illustrating some new styles of Harness Snaps, Pocket Wrenches, Excelsior Lathe for Amateurs and Mechanics, and the "Exigency" Screw Driver.

Sidney Shepard & Co., proprietors of the Buffalo Stamping Works, Buffalo, N. Y., have issued the following circular:

BUFFALO, Jan. 15th, 1877.

We take pleasure in advising the trade, that on or before Feb. 15th, next, we shall open a branch warehouse, at No. 86 Lake street, Chicago, Ill., where will be found a large stock and full line of our own manufacture, Tinmen's Supplies and House Furnishing Hardware.

We find this action on our part necessary, in order to facilitate the business of our extended and increasing trade throughout the East, West and South. This department will be under the management of two resident partners, Messrs. Chas. G. Dennison and Geo. A. Tripp. Orders for this branch, from those favorably located, respectfully solicited.

SIDNEY SHEPARD & CO.

Charles Forschner, Manufacturer of Butchers' Tools and Machinery, No. 41 Rivington street, has issued a catalogue and price list of his specialties. Among the goods illustrated are Patent Upright Cylinder Stuffing Machines; Horizontal Filling Machines; Meat Stuffers; with Copper or Galvanized Cylinders; Lard Coolers and Presses; Portable Boilers for use with wood or coal; Meat Rockers, with 4, 5 and 6 Knives; Kinyons Patent Choppers for hand and power; Butchers' Saws, Steels, Cleavers, &c.

We print below the third annual circular of the United States Iron and Tin Plate Co., of Pittsburgh. The works of the company are at McKeesport, Pa.:

PITTSBURGH, Jan. 2, 1877.

DEAR SIR: At the beginning of the new year we avail ourselves of the opportunity to render you our compliments, and to express to you our thanks for the patronage with which you have favored us in the past.

Our efforts to introduce a new branch of the metal industry into this country, have so far met with success, that we are now able to enter into the new year with increased facilities and improved arrangements to meet the wants of our customers.

The Tin and Terne Plate trade has been so depressed and prices have been so low that we have hardly derived any profits out of this branch of our business. In consequence of the stringency in the English market and the very low prices at which the English manufacturers have disposed of their products, we have not been able to develop the industry to such an extent as we would have liked; we had to discontinue the manufacture of Bright Tin Plate at present, but we shall still manufacture the U. S. Terne Plates, which have already gained a very favorable reputation throughout the country, hoping that with the coming season the business will brighten up and that a fair price will be paid for this article.

By constant practice we have obtained considerable experience in the production of fine polished or unpolished Stamping Iron, and by the new arrangements which we have made lately we are able to manufacture an article

equal, if not superior, in quality and finish to anything in this line; while we have been heretofore unable to make sheets larger than 24x60, we can in future furnish the same to order in any size between 10x14 and 24x84; also in circles from 8 to 24 inches diameter, at an advance in price of 20 per cent. over the square; we are making various grades at different prices to suit the test which the work may require.

Of late we have introduced Steel Plates for Shovels and other agricultural purposes, and have met with good success. The plates have a fine smooth surface, and are hard and tough; we will furnish them to order in square sizes to cut the blank with very little waste. We also manufacture different grades of Shovel Iron with common or polished surface.

We also continue in the manufacture of Sign Plate Iron, and assure you that we will do all that is possible to produce as fine an article as can be made.

Our products in general have been rapidly gaining in the favor of dealers and consumers, and our trade has grown extensively during the last year. Although we have made considerable enlargements at our works, we would request you, in case you are willing to favor us with your orders, to give us as much time as possible for their execution, in order to enable us to give all care and attention to the filling of the same.

In ordering from us we would also request you to state for what purpose the Iron is needed, and we shall be able to tell which grade will suit you best.

We shall be pleased to have your favored correspondence, and request you to send for our prices. We remain,  
Very respectfully yours,  
U. S. IRON AND TIN PLATE CO.

W. C. CROMBIE, Secretary.

John C. Jewett & Sons, Buffalo, N. Y., have issued their annual catalogue for 1877. The book which covers 120 pages, is handsomely illustrated. Their assortment of Refrigerators is particularly fine, and 16 pages of their book is devoted to this specialty. They also illustrate a variety of designs in Water Coolers, and Jewett's Patent Water Filters, with Porcelain lined Cooler; for this line of goods they print a number of flattering testimonials from dealers and others who have tested them. The assortment of Bird Cages, Japanned Tinware, etc., is large and complete, and in miscellaneous House Furnishing goods a large variety is shown than in any of their preceding catalogues. We print below their price list for Refrigerators and Ice Cream Freezers; also their discount sheet. The dimensions given in the list for Refrigerators is in every instance outside measure:

Jewett's Palace Refrigerator.				
Length.	Depth.	Height.	Prices.	
Inches.	Inches.	Inches.	Each.	
No. 41.....	35	22	43	\$34-00
No. 42.....	35	24	45	28-00
No. 43.....	39	26	48	32-00
No. 44.....	43	27	50	36-00
No. 45.....	47	28	52	40-00

The Hardwood Palace Refrigerator, Ice Preserver and Wine Cooler.

Length.	Depth.	Height.	Prices.	
Inches.	Inches.	Inches.	Each.	
No. 52.....	37	25	48	\$38-00
No. 53.....	41	26	49	42-00
No. 54.....	44	27	50	46-00

Jewett's Patent Improved Queen Refrigerator.

Patented Dec. 18, 1866.—Handsome Oak Grained. Galvanized Wire Shelves.—Porcelain Casters.—Bronzed Trimmings.

Within the past year very important improvements have been made in the "Queen," and we believe it will be pronounced decidedly the best low-priced family Refrigerator in the market. We have added two new sizes, as will be noticed below.

Length.	Depth.	Height.	Prices.	
Inches.	Inches.	Inches.	Each.	
No. 20.....	26	17	40	\$12-00
No. 21.....	28	18	42	14-50
No. 22.....	30	19	44	17-00
No. 23.....	33	21	46	19-50
No. 24.....	36	23	48	22-00

Jew

**Scrap Iron.**—There is no change to report, the limited supply enables holders to realize former quotations, but the demand is not very active. Sales are reported of all grades within the range of our quotations, say : Cast, \$15 to \$17; and Wrought, \$24 to \$26.

**Nails.**—Business is still very limited, and quotations are as before, viz. : \$3-90 to the trade, and \$3-15 to consumers.

**Tin Plates.**—There is a fair business doing, considering the general depression, but an improvement is anticipated at an early date. We quote, in United States currency, jobbing rates as follows : I. C., 10x14, Best Charcoal Bright, 88; I. X., 10x14, \$10-25; Best Charcoal Leaded, 28x20, \$14-50 to \$15; good Charcoal Leaded, \$14 to \$14-25; other good brands, \$13 to \$14; good Bright Tin for Cans, &c., \$6-50 to \$7-25; Coke Leaded, 14x20, \$6 to \$6-50.

**Coke.**—The destruction of some 300,000 to 400,000 bushels by the breaking up of the ice in the river last week, has stiffened the market somewhat by reducing the supply but prices

are quiet, and are not likely to become brisk in the immediate future. The Birmingham Advertiser says: "In most of the rough and heavy iron and hardware branches manufacturers are endeavoring to stimulate the demand by announcements of reductions. Of these the more important are a reduction in the price of nickel from 7 1/2 to 6 per pound, less 5 per cent.; about 14 per cent. in the price of iron wood screws; an increased discount of 5 per cent. on tinued ho-

low ware and coffee mills, and of 2½ per cent. on enameled hollow ware. Lath and wall nails have been reduced 2 per cent.; forged nails in the Dudley district about 7½ per cent.; cut nails about 10 per cent., and reductions of various amounts are announced also in horse-shoes, German silver, gold composition, plate and wire, etc. These reductions extend—and the list might be considerably extended—tell a tale of the shifts to which manufacturers are put to woe trade, for in very few instances is there any corresponding or proportionate reduction in raw material. The slackness appears to be almost exclusively in our export trade, as factors generally do not report any falling off in their turn over, though business in many instances is less profitable than it used to be, owing to the keenness of competition in the retail character of the individual orders. On the other hand, had debts been less numerous than when trade was more buoyant, and in few branches are the stocks heavy.

In the foundry branches there is a little more business doing, and, after a long period of dullness, there is at length an improvement in the inquiry for jewelry. Builders' hardware is in very fair request, and there is a very encouraging demand for brass foundry goods and locks. There is some little inquiry for Japanese ware, lanterns, bright tin goods, ivory buttons, railway and carriage lamps, hollow wares and steel pens. The pin trade is said to be suffering from the development of the American iron pin manufacture. Is this really the case, do you suppose?

**SOUTH WALES AND MONMOUTHSHIRE** continue dull all round in respect of the iron trade, although it is stated that there are signs of improvement at Blenavon, Ebbw Vale, Rhymney, Tredegar and Treforest. The tin plate trade is falling off, but prices remain steady so far.

**THE METAL MARKETS** have remained quiet, with a depression in prices.

Messrs. Von Dadelzen & North say: "Copper.—Chill bars are rather lower, business having been done in g. o. brands at £76 and £75 10/10. The closing quotation is £76 10/10, according to brand; ore and regulus, 15/10 to 16/3. The market for the last half of December are telegraphed as 2700 tons. In Australian little has been done. Wallaroo is quoted £85 10/10; Burra, £84. The next public sale of Wallaroo is advertised for the 33d inst. Quantity and conditions will be given on Tuesday, the 9th inst. English is steady; tough, £81 to £83; select, £83 to £85; strong sheets, £88 to £90; Indian sheets, £87 10/10. Tin has been inactive. Straits has been sold at £76 to £75, the nearest quotation for spot parcels being £75 10/10. Australian, £74 10/10. English flat, ingots, £78 to £79; bars, £79 to £80. In Holland the market is quiet. Banca quoted 45½; Billiton, 44½. Tin plates.—No change. Lead.—English pig is dull, and quoted £21 15/10 to £22 5/10. Sales of soft Spanish, without silver, have been made at £21 10/10, ex ship, and £21 5/10 f. o. b. Business to some extent has been done in soft silver lead, for Newcastle, at £21 5/10. Spelter decidedly flat, and quoted £21 5/10 for ordinary Silesian. Sheet zinc is lower. At the public sale this week, out of 125 tons only 50 tons found buyers, at £25 2/6 to £24 10/10. Quicksilver was reduced on the 1st inst. to 48 per bottle, and again advanced the next day to 48 5/10, our present quotation. Antimony.—£56 for English star."

The Mining Journal remarks: "The new year has opened quietly for metals, our markets being devoid of speculation, and the demand strictly confined to bona fide requirements, which have been of a limited character. But this is not unusual about this time, as merchants are always busily engaged in balancing their books for the past year. Prices generally have been rather depressed, and the accumulation of stocks is not a very hopeful sign, especially when taken in combination with the bank rate, for if the state of trade with money at 2 per cent. does not strengthen prices it cannot be expected that any advance could take place under higher rates and with statistics daily becoming more favorable. The stock of Copper on the 1st inst. amounted to 43,335 tons, since which charters have been announced of 2700 tons for the last fortnight of December, and the quarterly sale of Wallaroo is announced for the 3d inst. The stock of Tin on the spot and for arrival is estimated at 10,136 tons, together with Billiton, Banca, &c., in Holland, 15,421 tons. The stock of Spelter in London and outports, on the 1st inst., amounted to 2780 tons."

The Cornish smelters' quarterly returns of the sale of copper ore for the three months ending December 30, show that the total sold was 14,120 tons, which realized £61,079, an average of £4 6/6 per ton. Of fine copper there were sold 943 tons 9 cwt. at an average standard of £105 12/10. At the Truro ticketing, on the 5th inst., 1420 tons of copper ore realized £6333 18/10, an average of £4 9/10 per ton, and 99 tons 10 cwt. of fine copper an average of £103. Latest Liverpool prices are:

Iron: f. o. b. in Liverpool, per ton.			
Merchant bar	£ 15 0	d. 6	17 6
Merchant bar, in Wales	£ 6 5	d. 0	7 6
Staffordshire	£ 7 5	d. 0	9 15 0
Hoop	£ 8 0	d. 0	9 0 0
Sheet	£ 5 0	d. 0	10 0 0
Nail rod	£ 7 10	d. 0	8 0 0
Bar, best crown	£ 7 5	d. 0	8 0 0
Boiler plates	£ 9 5	d. 0	10 10 0

**Tin Plates: f. o. b. in Liverpool, per box.**

Charcoal, I. C.	£ 1 5	d. 0	1 7 0
Coke, I. C.	£ 1 0	d. 0	1 2 0

**Copper: Delivered in Liverpool, per ton.**

Bolt and Sheathing	£ 85 0	d. 0	0 0 0
Tin	£ 92 0	d. 0	0 0 0
Tough cake	£ 80 0	d. 0	0 0 0
Best selected	£ 87 0	d. 0	0 0 0

I make the following extracts from the price current of Messrs. Henry Rogers, Sons & Co., London, Jan. 5, 1877:

"Copper.—The statistical position of copper for the close of the year cannot be said to be particularly satisfactory, but the present price is a moderate one, and there is ample margin for a fair advance should peace be declared, and a speculative inquiry spring up. The imports of copper taken from the Board of Trade returns for the 11 months of the 6 past years were as follows:

**ESTIMATED IN FINE COPPER.**

1871.	1872.	1873.	1874.	1875.	1876.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.

59,960 76,915 64,162 65,576 72,129 71,720

"The exports in the same periods, including foreign, were:

1871.	1872.	1873.	1874.	1875.	1876.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.

49,570 41,153 49,983 54,387 45,226 47,104

"The stocks of copper on the spot on the 31st Dec. of the same years were:

1871.	1872.	1873.	1874.	1875.	1876.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.

15,054 32,001 28,592 20,668 30,383 29,530

"The stocks including abroad and chartered were:

1871.	1872.	1873.	1874.	1875.	1876.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.

30,054 41,991 35,963 29,792 28,978 34,226

"The exports from Chili to the 13th November, in the same year, were:

1871.	1872.	1873.	1874.	1875.	1876.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.

36,965 40,145 36,798 41,783 41,289 44,354

"The total charters of West Coast produce for the year, were 49,400 tons, against 48,700 tons in 1875.

"The prices and stock on the 1st day of each month throughout the year were as follows:

	Price.	Stock on hand.	Stock including abroad and chartered.
	£ s. d.	Tons.	Tons.
1st Jan., 1876	£81 10	20,583	28,978
1st Feb., 1876	81	20,392	27,545
1st March, 1876	76	21,563	30,317
1st April, 1876	77	20,734	30,982
1st May, 1876	79 10	21,169	31,988
1st June, 1876	78	22,682	30,997
1st July, 1876	74	23,854	31,431
1st Aug., 1876	72	23,536	31,893
1st Sept., 1876	72	24,417	30,548
1st Oct., 1876	73	24,879	31,679
1st Nov., 1876	76 10	26,740	33,476
1st Dec., 1876	76	25,892	31,623
and 31st Dec., 1876	76 10	26,580	31,226

"Tin.—The demand during December was sufficient to maintain the prices quoted from day to day, but the amount of business done was not large; the violent fluctuations in the Indian Exchange makes a purchase in the Straits somewhat of a risky business; hence the changes in prices here are ruled very much by the rates for bills on the East than by demand. Australian tin has brought good prices, but in English there has been much underselling, and at very low prices for some brands. The total values of tin plates exported to the end of November in the following years were: 1871, £2,662,814; 1872, £2,585,540; 1873, £3,724,292; 1874, £2,435,548; 1875, £3,442,553; 1876, £2,683,168. Spelter.—There would seem to be an utter collapse in this trade, but from what cause produced, it is difficult to say. The English smelters are almost without stocks of raw materials, and hence will not reduce their price, but in order to assist speculators for a fall, a few lots of common Silesian brands are hawked about the market at ruinous prices from day to day, alarming consumers to such an extent that they will only buy for immediate wants. The trade in English spelter is thus virtually closed, while that for foreign is at the mercy of certain speculators who "rig" the market just to suit their own operations. The sheet zinc is in a depressed condition, and the auction sales of the London mills have of late failed to attract buyers to the full extent of the quantities offered. Lead.—The price of this metal was exceedingly firm throughout the greater part of December, but toward the close receded about 5/ for common sorts. For special brands there was a good demand from China, and as freights ruled low, a fair trade was done. Freight has since advanced, and the demand has decidedly fallen off, but no considerable drop is looked for in lead."

#### Lead Movement in 1876.

The following review of the lead market for 1876 is prepared by Edward A. Caswell, metal broker, No. 240 Pearl Street:

The Centennial year has passed away, with it all its expected remunerative business and large profits, in place of which we have seen a somewhat limited sale of goods, shrinkage of values, unhealthy competition, and small earnings on the profit side. The decline in gold of nearly ten per cent. has added to the trials of importers and consumers, who purchased their raw material in coin; but at present writing this variable, speculative and troublesome factor bids fair soon to disappear from merchants' calculations. With that point settled, the presidential middle cleared up, and confidence reassured, we may fairly hope for the long expected reaction in business, and the much talked of "better times."

Pig lead has of course sympathized with trade in general, except that its decline has been proportionately greater than that of other articles, owing to the fact that the price had been previously sustained by large capital in strong hands, so that to the normal fall was added the margin of fictitious advance. Within ten weeks the actual currency decline was nearly 20 per cent.; at the same time, base bullion fell only 12 to 15 per cent., showing pretty clearly that refiners must either have made very large profits previously, or else are now working nearly at cost. Every one familiar with the figures knows the latter supposition to be correct, and that bullion must decline or lead advance to afford a reasonable profit.

The United States production of 1876 exceeded that of 1875 by 3967 tons, and the supply of 1876 exceeded that of 1875 by 1482 tons. Stocks throughout the country January 1, 1877, were less by about 600 tons than in 1876, but our consumption was apparently about 2000 tons more last year than the year before, but it must be noted that about 4300 tons of imported metal that figures in the supplies of 1876, was re-exported to Europe in the form of bullets, so that in reality the consumption fell off 2000 tons, while with a fair demand and ordinary increase of trade, it should have been an increased consumption of six to eight thousand tons.

The year has been devoid of any peculiarly new features in lead, except that we have clearly shown our capacity for a domestic production sufficient to render us entirely independent of any supply from foreign sources, and figures confirm the view that the supply must eventually be large enough to admit of exportation, for the mines thus far opened and worked are so few compared to the known and unopened rich deposits in Missouri and the far West that we may consider their capacity as almost limitless; and also the variety of sources is a guarantee of security, which we would not have been entirely dependent on two or three mammoth mines that might give out at any time; for although the Richmond and Telegraph mines together have turned out about one-sixth of the desilverized product, we can point to a dozen others that are scattered through Colorado, Utah, Montana, New Mexico and California that also have work in sight for some years.

Utah at present far outstrips all other states in lead. It has produced about three-fourths of the refined supply in 1876, and has even run ahead of Missouri, "by a large majority on a fair count." Missouri gave promise early in the year of yielding an enormous increase; but the output fell off toward the end of the year, and the total is but a few tons ahead of 1875. Galena, on the contrary, shows an increase of nearly 25 per cent. Both Missouri and Galena are to-day unquestionably in far better positions than ever before to increase production, having made judicious outlay of capital, and introduced labor-saving appliances, and more systematic methods of working.

In the far West the lead interests are now on a substantial footing, and mainly in the hands of practical working men who know their business, and use their own capital with that caution and judgment which did not always characterize the policy of stock companies, having high salaried officers whose ignorance and reckless management ruined many good mines, and cast a shadow over mining investments, which are in reality as safe and remunerative as others.

The past year has shown the beginning of a competition between the argentiferous lead of the far West, and the virgin leads of Missouri,

which will assume more serious character in the future. The Missouri ores are rich in lead near the surface, and prepared at slight cost, convenient to lines of transportation and a market, and worked in such a manner as to incur no risk or loss to the owner, so that production can only be checked when labor really finds more remunerative employment in other occupations.

On the other hand, argentiferous ores carry less lead, are deep in the earth and must be extracted with greater risk at considerable outlay of capital, require an expensive treatment and pay high rates for transportation; but all these drawbacks are paid for by the silver extracted, and render these ores dangerous competitors to Missouri.

The improvement in quality of leads used for corrosion has been very marked, and the desilverized brands have reached a standard that satisfies our most fastidious cordroers, and precludes farther importation except at competition in price. Greater care and new methods of smelting have improved the quality, and rendered more uniform the Granby and several other brands of soft Missouri lead, and opened the way to an improvement in this respect which was greatly needed. It has also shown to Missouri smelters that the added cost of extra refining is more than covered by the enhanced price obtainable.

The entire importation of the year, except a few hundred tons, has been for the manufacture of cartridges for re-exportation, so that the quantity of foreign lead consumed in this country is now reduced almost to zero, and the revenue to the United States government from this year cannot have reached \$50,000, while in 1870 it exceeded one and one-half million.

It is natural therefore to expect that a government measure for revenue will legislate as to recover this last source of income, and it is equally natural that when convenient the bug-bear of reduction in tariff should be used to influence markets; and yet the whole question has been virtually settled by the production of this country, which has been so large that prices have fallen off simply from domestic competition, until our currency price is so low that Mexican bullion coming here in bond has been profitably exported to Europe, and our New York price stands to day more than one cent per pound below the price of common Spanish, laid down here duty paid. In considering a reduction in the lead tariff it is therefore our government that is placed in a dilemma and not the lead producers, for the tariff can be reduced one cent per pound and yet no lead would be imported. If then the tariff should be reduced to three-quarters of a cent per pound, we must shrink on the seaboard only \$5 per ton, and at the West nothing (freights being then an item), to compete favorably with foreign lead; and if the tariff should be reduced to half a cent per pound, we must shrink but \$10 a ton, and even that shrinkage would check production so slightly that the revenue at that low tariff would be extremely small, while a quarter of a cent duty per pound would be too insignificant to be proposed. Finally, a free trade policy in lead at present would only cripple our productive powers and bring nothing into the treasury; and that suicidal course is in no wise to be feared. In the course of time, after many reverses, fluctuations, discoveries and improvements, lead will of itself naturally stand on a basis of free trade without the interference of legislation as the tendency of our markets sufficiently shows, although there may be brief seasons of active trade and short supply, when prices may temporarily approximate nearer to the price of foreign lead; especially should a less favorable situation in Europe permit an accumulation of lead there and a severe decline in their prices.

#### Movements of Lead in New York City.

	1873.	1874.	1875.	1876.
Imported	15,512	11,763	4,900	4,138
Government sales	2,460	4,125	915	1,550
Doctored and improved	6,100	5,500	8,300	7,776
Western receipts	2,150	2,316	4,856	5,521
California receipts	2,900	6,029	5,277	4,018

Stock in first hands in New York city Jan. 1, 1875, about 4,000 gross tons.

Stock in first hands in New York city Jan. 1, 1876, about 1,500 " "

Stock in first hands in New York city Jan. 1, 1877, about 700 " "

#### Determining the Velocity and Leeway of Ships.

The determination of a ship's movement at a time when regular observations are impossible is one of the most difficult but important duties of the navigator. Long experience may give a captain a very fair knowledge of the forces of oceanic currents, but usually it is a mere matter of good luck if his vessel escapes disaster from these causes. This danger arises more frequently during fogs and at night than during clear weather and daylight, because in either of these latter cases the land becomes visible soon enough to admit of a correction of the ship's course. Dr. Schallern, of this city, has invented an apparatus which he claims will measure with accuracy the progressive motion of a ship and the lateral motion technically known as "leeway."

Dr. Schallern's invention consists in the application of a tube fitted to the keel of the ship and open at the bow end. The tube is led into the body of the vessel, where it is attached to an elastic cylinder fitted with a movable top, formed by a brass plate. The pressure of the water in the tube when the ship is in progressive motion raises this brass plate and with it a brass rod to which it is attached. The rod passes into the captain's cabin, where it operates an instrument that indicates the water pressure in the pipe, and consequently the velocity of the ship's direct motion. Another instrument, similarly operated by the water pressure in tubes attached to the vessel's sides, registers her lateral motion or leeway. In order to protect the open ends of the tubes from being closed by any matter suspended in the water the orifices are covered by a wire meshing, which acts as a strainer on the water. It is here that we perceive a grave defect in the apparatus. There is nothing to prevent the meshes from being covered with barnacles or sea grass growing on the ship's sides and keel. Even if the tube ends project some distance from the vessel this difficulty would not be obviated. Again, if the meshes are not sufficiently open to admit a moderately free flow of the water as the ship rises and falls in a heavy sea, the indications of pressure must be extremely inaccurate. If any minute marine animal, infusoria or particles of sand enter the tube they will in time reduce its diameter, choke it altogether at the bends, or considerably increase the friction of the water on the inner surface of the tube. Another objection must be the impossibility of leading the tube to

clean it. The variations of temperature of the water may create inaccuracies in the records of pressure, but the chief difficulties are those that would be caused by the fouling of the tube from various causes. Any apparatus for determining the direct motion and leeway of a ship must be movable and capable of being easily and quickly applied. That invented by Dr. Schallern does not strike us as being applicable for its purpose, although the leading idea in the general conception is a sound one.

#### Electro-Plating with Aluminium, Magnesium, Cadmium, Bismuth, Antimony and Palladium.

M. A. Bertrand has obtained deposits of aluminium on decomposing with a strong battery a solution of the double chloride of aluminium and ammonium. A plate of copper, forming the negative pole, whitens gradually, and becomes covered with a layer of aluminium, which takes a brilliant polish under the burnisher. The double chloride of magnesium and ammonium in an aqueous solution is readily decomposed by the battery, giving in a few minutes strongly adherent and homogeneous deposits of magnesium upon a sheet of copper. It polishes readily. The battery must be powerful. Cadmium is best deposited from the bromide to which a little sulphuric acid has been added. It is then very coherent and very white, and takes a fine polish. The sulphate, if acidulated, also gives an immediate deposit of metallic cadmium, very adhesive, and capable of a fine polish. Bismuth is deposited from a solution of the double chloride of bismuth and ammonium upon copper or brass by the current from a Bunsen element. It is very adhesive; though, mat, it is capable of taking a fine polish, and may be introduced in the decoration of objects of art. Antimony can be deposited from a solution of the double chloride of antimony and ammonium at common temperatures. It frequently serves to replace platinum black in a number of fine art manufactures. Deposits of palladium are obtained with ease by means of the double chloride of palladium and ammonium, either with or without the battery. The solution must be perfectly neutral.—Comptes Rendus.

The attention of the French Academy of Sciences has been called to a recent invention perfected by M. Jabiochhoff, which bids fair to bring the electric light into common use. The most delicate part of the electric light apparatus has been the adjustment of the distance between the carbon points, and it is here that M. Jabiochhoff steps in from quite a new path. Instead of placing the carbons end to end he places them parallel with each other, and separated by some insulating material. The whole is then placed in a cylinder of refractory material in the form of a double carbon wick candle. By this arrangement the two carbons burn by their extremity, there being no necessity for regulators, as the insulating material keeps them at a constant distance. This material, as well as the cylinder, is consumed in the same time as the carbon, its volatility augmenting the light. Previous to this discovery it was necessary to have a regulator for each lamp, and at great cost, but now a single source of electricity may feed a number of burners, thus permitting the most effective distribution of the light.

The curious discovery, says the *Scientific American*, is announced by Prof. P. B. Wilson, of Baltimore, that minutely pulverized silica is taken up in a free state by plants from the soil, and that such silica is assimilated without chemical or other change. The experiment consisted in fertilizing a field of wheat with the infusorial earth found near Richmond, Va. This earth, it is well known, consists of shells of microscopic marine insects, known as diatoms, which, under strong magnifying powers, reveal many beautiful forms that have been resolved, classified and named. After the wheat was grown Prof. Wilson treated the straw with nitric acid, subjected the remains to microscopic test, and found therein the same kinds of shells or diatoms that are present in the Richmond earth, except that the larger sized shells were absent, showing that only silica particles below a certain degree of fineness can ascend the sap pores of the plant.

The contract price to be paid by the Admiralty to Messrs. Penn & Sons, of Greenwich, for the engines, shafting and propellers, boilers, etc., of the twin screw armor clad Northampton is, we understand, £35,500. For the supply of the engines and machinery of Her Majesty's ship Agamemnon, the contract for which has just been obtained by the same firm, the cost is to be £20,000. Messrs. John Elder & Co.'s contract price for the engines, boilers, and other machinery of the Indefatigable was fully £120,000, which is, we believe, the largest sum ever paid for the engines of a single ship.

The trial of the Waterwitch gunboat, fitted with turbine hydraulic propeller, on the plan of Mr. M. Ruthven, is an event of great interest. The vessel is a sister ship to the Vixen and Viper, armor-plated gunboats. The trial was most satisfactory, nearly one-third of a knot increase of speed having been obtained with somewhat less indicated horse-power, and it is evident that by lowering the turbine to nearly a level with the bottom of the vessel a still greater advantage will be obtained.

Sideraphthite is the name of a new iron amalgam which is composed of 65 parts iron, 23 nickel, 4 tungsten, 5 aluminum, 5 copper. It resists sulphureted hydrogen, is not attacked by vegetable acids, and only slightly by mineral acids. It is really more useful than standard silver, while it can be produced at a cost not exceeding that of German silver. For alloys which have to be silver-plated to prevent oxidation, the inoxidizable iron, as the above is called, is stated to be a perfectly successful substitute.

## The Coal Market.

### Anthracite.

PRICES FOR JANUARY.

	Lump.	Standard.	Broken.	Egg.	Stove.	Chestnut.
PENNSYLVANIA COAL CO., at New York, 40 cents per ton additional. Deliverable at Weehawken.						
Pittston	3 00	3 00	3 00	3 10	3 60	3 36

DELAWARE AND HUDSON CANAL CO., at Weehawken, N. J.

Lackawanna	3 00	3 00	3 00	3 00	3 80	3 30
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LEHIGH AND WILKES-BARRE COAL CO., f. o. b., at Port Johnson, N. J.

Old Company's Summit	3 75	3 25	3 25	3 75	3 25	
Honey-Brook Lehigh	3 75	3 25	3 25	3 75	3 25	
Wilkes-Barre	3 00	3 00	3 00	3 75	3 25	
Plymouth Red Ash	3 00	3 00	3 00	3 75	3 25	

DELAWARE, LACKAWANNA AND WESTERN, at Hoboken, N. J.—Auction, Nov. 23.

Scranton	3 77½	3 70	3 67½	3 59½	3 27½	
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FREDERICK A. POTTS, 110 Broadway, New York.—Post Johnson, Elizabethport and Hoboken.

L. & W. C. Co.'s Wilkes	3 00	3 00	3 00	3 75	3 25	
L. & W. C. Co.'s, Old	3 75	3 25	3 25	3 75	3 25	
L. & W. C. Co.'s, Plymouth Red Ash	3 00	3 00	3 00	3 75	3 25	
L. & W. C. Co.'s, Honey-Brook Lehigh	3 75	3 25	3 25	3 75	3 25	
Scranton	3 00	3 00	3 00	3 75	3 25	

WHITNEY, McCREARY & KEMMERER, 111 Broadway, New York.—John White, Sales Agent.—F. o. b. at Elizabethport or South Amboy.

Upper Lehigh and Council Ridge	3 75	3 25	3 25	3 75	3 25	
Everhardt Wyoming	3 75	3 25	3 25	3 75	3 25	
Wilkes-Barre	3 75	3 25	3 25	3 75	3 25	
Shamokin	3 75	3 25	3 25	3 75	3 25	
East Spring Mountain Lehigh	3 75	3 25	3 25	3 75	3 25	

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 These recent improvements in combination with the nut inside the ferrule firmly screwed up flush against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.  
 We would also call attention to the fact, that in 1868 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the *Genuine Wrench* by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped  
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 One Sheet of Impression paper, and  
 One Brad Awl.  
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 List price, per Box, \$1.25.  
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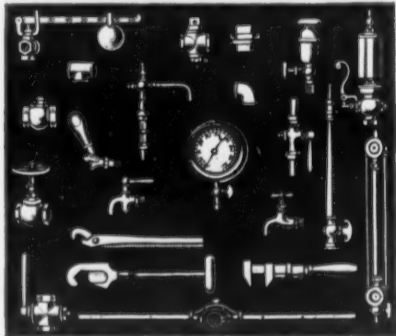
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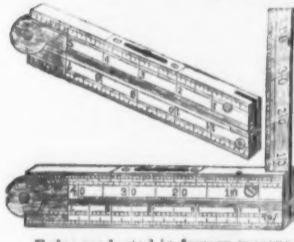
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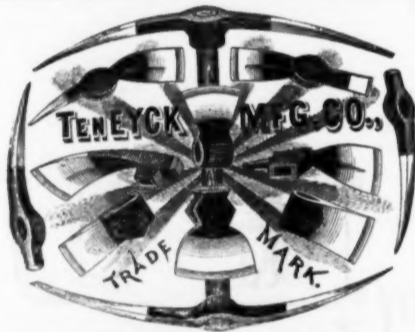
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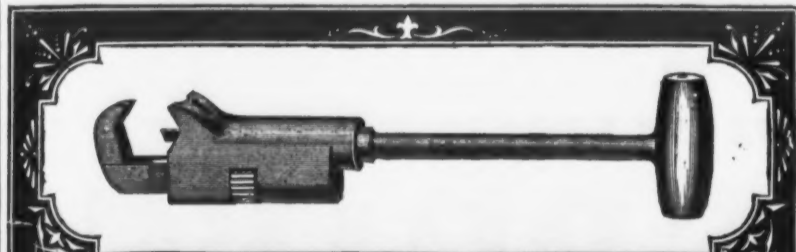
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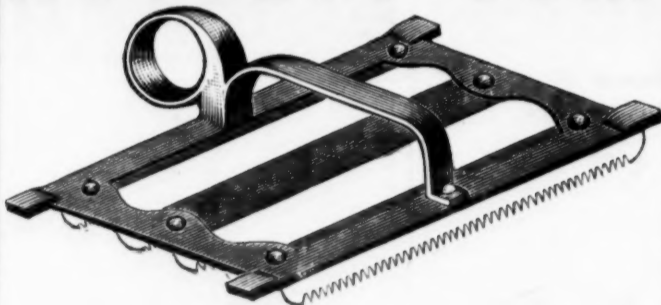
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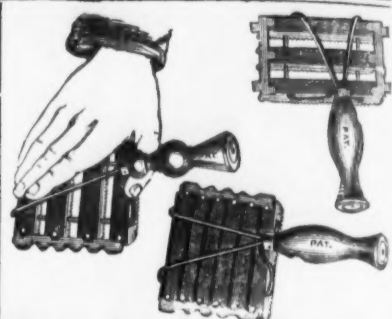


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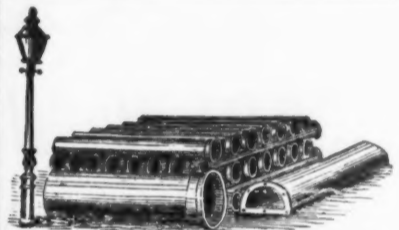
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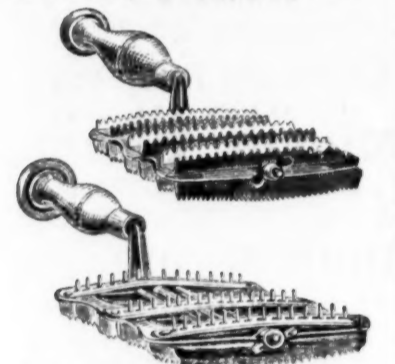
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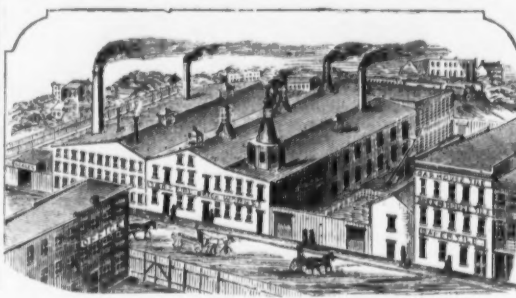
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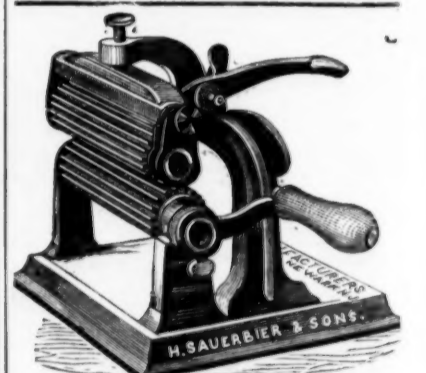
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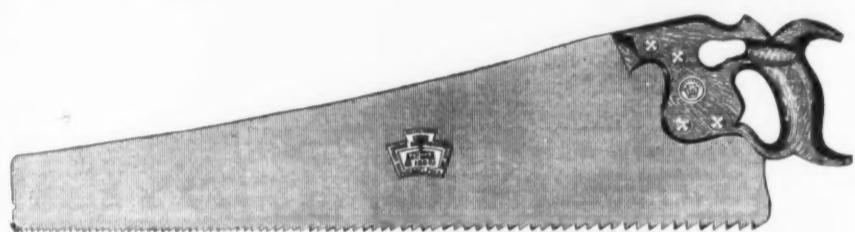
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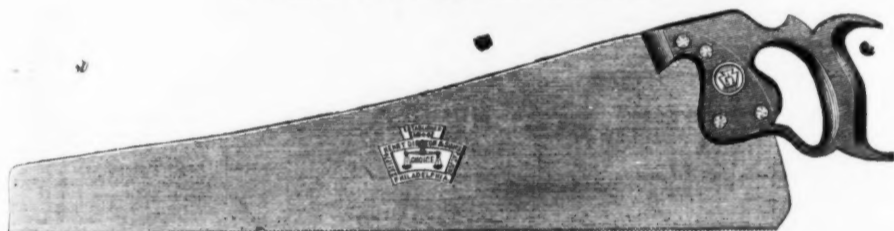
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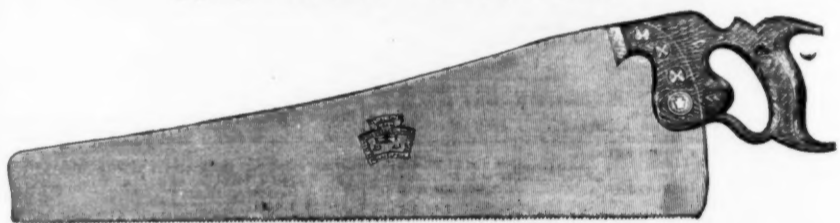
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Patent Double Grip Skew Back Saw.



Patent Skew Back "Choice," No. 80.



Patent Skew Back, No. 76.



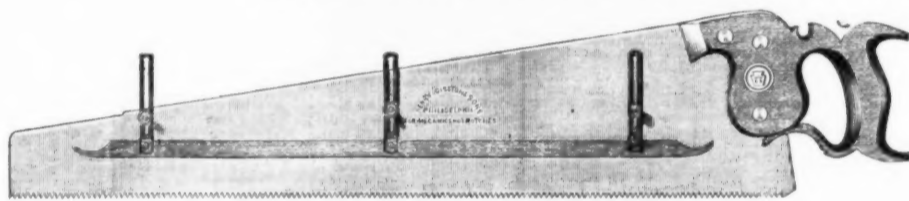
No. 7 Hand Saw.



Beveled Back Turning and Felloe Webs.



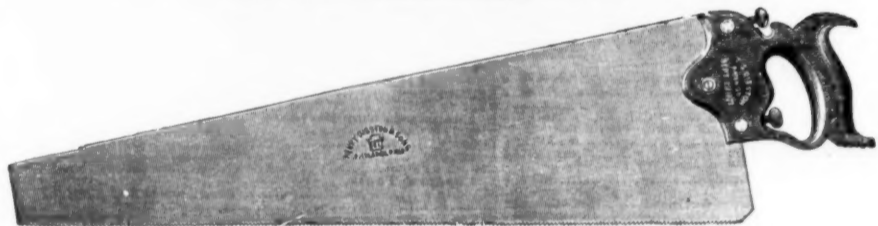
Patent Improved Combination Saw.



Patent Gauge Saw, Quality No. 7.



Patent Combination Saw, No. 29.



Hand Saw with Patent Adjustable Handle.

### BUTCHERS' BOW BACK SAWS.



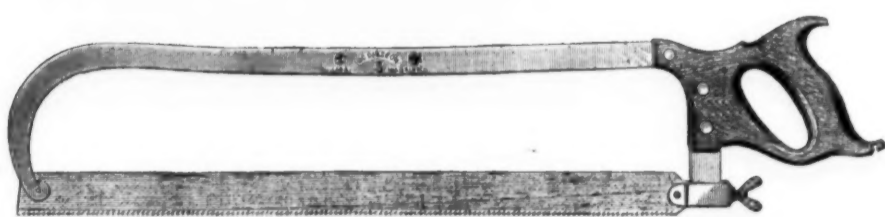
No. 1, California Flat Steel Back, Clock Spring Blades.



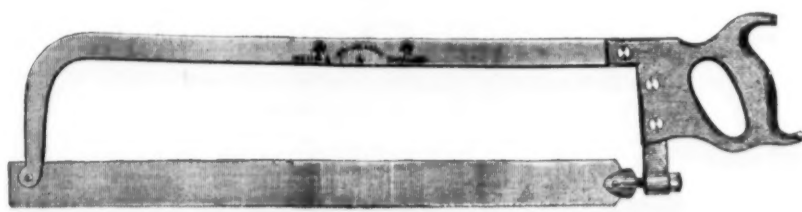
No. 2, California Oval Steel Back. Sizes, 16 to 24 inches.



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No. 3, Flat Back. Sizes, 16 to 24 inches.



No. 4, Flat Back. Sizes, 16 to 24 inches.

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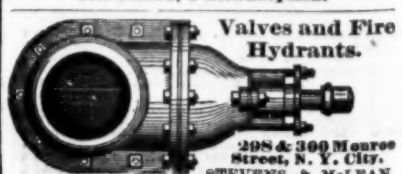


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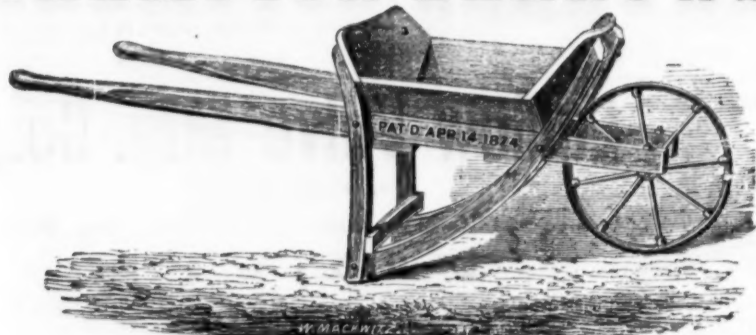
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Gauges of all lengths and circles beveled inside or outside. Nail Sets, Scratch and Belt Awns, Chise  
Handles of all kinds. Orders filled promptly; generally same day as received.

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### WITH WOOD OR IRON WHEELS.

A first-class article and a specialty, that will make a demand in any market and afford a good margin  
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BRYAN MANUFACTURING CO., Bryan, O.

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McILVAINE BROS.,

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No. 68 Lake Street, CHICAGO, ILL.,

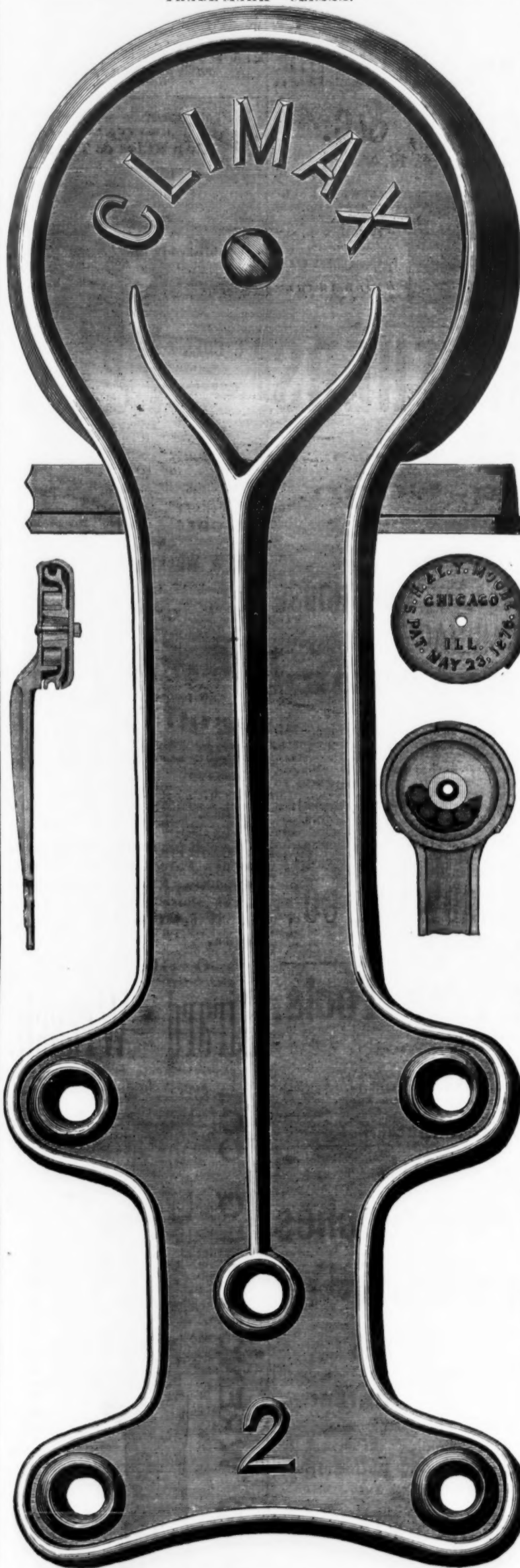
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### HEAVY HARDWARE,

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TRADE MARK "CLIMAX."



The above Cut shows Exact Size of No. 2 "Climax."

"CLIMAX" No. 1, EXTRA LARGE AND HEAVY, with long strap, for heavy warehouse doors,  
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Weight, 14 lbs. per pair. Packed 1/2 doz. pairs in a case. .... per doz. pairs, 15.00

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RAIL, with Double or Single Flange ..... per foot. ....

Packed 200 feet in a case. .... per foot. ....

Discount to the trade. Send for descriptive circulars. For sale by the hardware trade generally.

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Butchers' Tools, Machinery,

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BUTCHER'S MACHINE.

Choppers, Hand and Power.

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FILES and HORSE RASPS.

Rough & Ready  
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AXES.**BLAKE BROTHERS  
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TRIMMINGS, CARRIAGE,  
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Butchers' Cleavers,  
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"STEEL BAR." SAVES HALF THE TIME.

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SALES:  
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Best Sieve known; Clean, Neat and Durable.  
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**SCREW WRENCHES.**

Our goods have been very much improved recently, by making the Bar WIDE, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

**A. G. COES'**  
NEW PATENT  
**FERRULE**

Which cannot be forced back into the handle.  
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We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

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Stearn's Hollow Augers  
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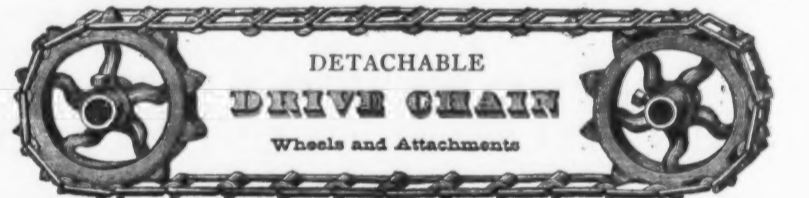
Double Edge Sook Shaves

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Flat Key Brass and Iron Pad Locks, &amp;c., &amp;c.

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**DRIVE CHAIN**

Wheels and Attachments

Positive transmission. NO Friction. Runs Fast or Slow,  
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Noiseless in service. Stretching. Runs Perpendicularly.

For carrying Buckets and Attachments it has no equal.

Is a Profitable Substitute for Belting, Shafting, Gears and Ropes.  
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With Purchase Gear,

Turns with half the labor that is required in turning other wringers. It is the latest Improved Universal Wringer, with Howell's Double Gear, with the addition of the Purchase Gear and Steel Spring which prevents the usual strain upon the rolls.

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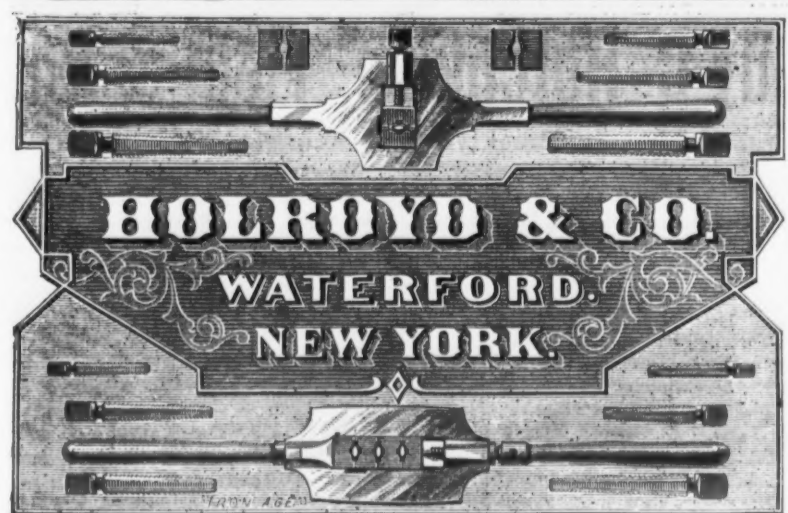
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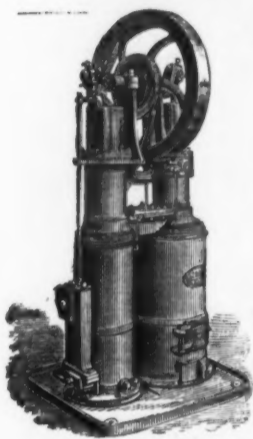
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All kinds of General Merchandise.  
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**NO BOILER,  
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NO DANGER.**

**Uses air as a Motive Power.  
VALVELESS, NOISELESS,  
Requires no Skilled Engineer.**

Costs only from FIVE to TEN CENTS per day for fuel.  
Particularly desirable for supplying  
RAILROAD TANKS, RESIDENCES, HOTELS, PUB-  
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**HAMMERED AND FINISHED HORSE NAILS.**  
We offer our Finished Nail to the trade with the confidence that it has no equal in the market. It is the genuine "Northwestern" Nail, Finished, and we give it our unqualified guaranty.  
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MANUFACTURERS OF  
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Recommended by over 20,000 Horse Shoers.  
All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

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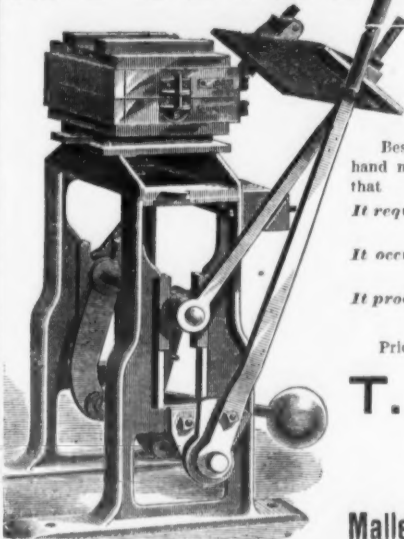
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**Marine & Stationary Engines, Mill Gearing  
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PUMPING ENGINES, for City and Town Supply a Specialty.**  
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## MOLDING MACHINE.

Prices Reduced.

**T. F. HAMMER'S PATENT.**



Beside all advantages Molding Machines possess over hand molding, it is especially adapted for this machine that  
It requires no special flasks or boards but the same are used as for hand molding.  
It occupies no more room than a bench for hand molding.  
It produces at less cost more, smoother and uniform castings.

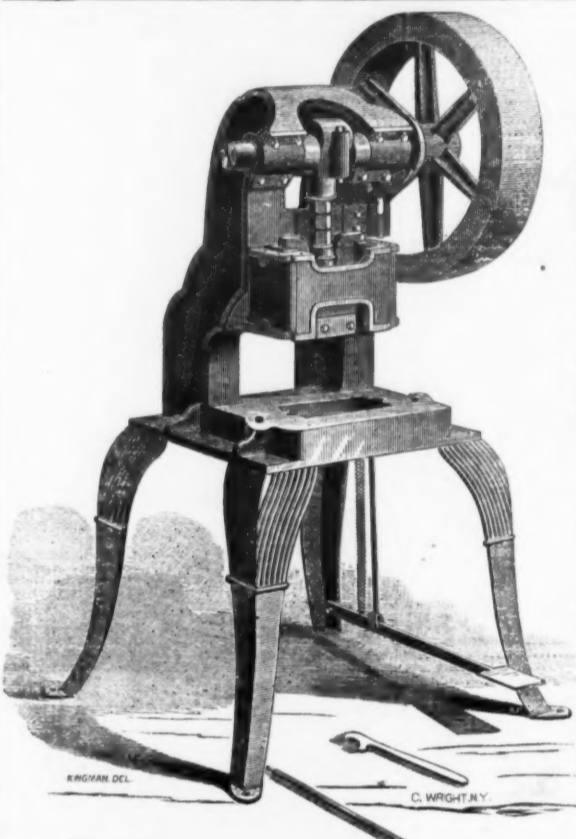
Price List on application.

**T. F. HAMMER,**

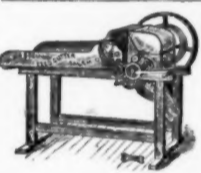
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Malleable Iron Castings made to order.



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FOR WORKING SHEET METALS, &c.  
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SALEM, OHIO, U. S. A.,  
Manufacturers of  
**Improved Feed Cutters**  
HORSE POWERS,  
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HUB BOXING MACHINES,  
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Blacksmith Drills, Saw Gummings, &c.  
Liberal discounts to the trade.  
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**Hydraulic Jacks and Punches,**

**ROLLER TUBE EXPANDERS**

**And Direct-Acting Steam Hammers.**

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

**GOLD MEDAL**

**Non-Extensible Razor Belt.**

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873 and JUNE 9, 1874.

In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

**PERMANENT ELASTICITY.**

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

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Badger Place, Charlestown, Mass.

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SEYMOUR, CONN., Manufacturers of

**THE VULCAN HORSE SHOE NAIL**

POINTED READY FOR DRIVING.

## HYDRAULIC JACKS

AND

**PUNCHES**

For  
Raising Heavy Weights,  
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**HYDRAULIC PRESSES**

On hand and made to order.  
Second Hand Hydraulic Presses  
Bought and Sold.

Machinery for Polishing and  
Buffing Metals.

Send for Circular. **E. LYON, 470 Grand St., N. Y.**

## JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.



We invite attention to the superior construction of this chuck. Its working parts are absolutely protected from dirt and chips. It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address,

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For Hotels & Stores a specialty.  
Machinery in General made to order.

**Ornamental Lanterns.**

**KRAMER & BOLZ, 180 Grand St.,**  
Manufacturers of  
Ornamental and Patent Iron Street and Station Lanterns. This house was awarded the highest premium at the Centennial Exposition. Send for Illustrated Catalogue.

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SCALE AND TESTING MACHINE  
ESTABLISHED 1840  
Patented "Furnace Charging Scale."  
Double Beam R. R. Truck Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.  
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**BUFFALO Bellows Factory and Planing Mill.**  
ESTABLISHED 1852.

**JOSEPH CHURCHYARD, Contractor, Builder**

AND  
**Manufacturer,**  
CLINTON, cor. ADAMS STS.,  
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**SASH, BLINDS DOORS,**  
Cisterns, Tanks, Stairs, Hand Rails, Newels, Mirror Frames, Mantels, Curtain Cornices, Book Cases, Veneered Doors, Mouldings, and complete interior and exterior finish for houses.

**ROUGH AND PLANED LUMBER,**  
Flooring, Siding, Shingles, Lath and Fence Posts.

**Blacksmiths' & Moulders' Bellows.**

**NEWCOMB BROS.,**  
Manufacturers of  
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**SCOTT'S**  
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BELLOWS  
JOHNSON ST. COR. 25th  
CHICAGO

**J. CLARK WILSON & CO., Agents**  
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**586 Water St., N. Y.**

**Standard Bellows.**

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**Standard Bellows.**

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**Standard Bellows.**

**Standard Bellows.**

**Standard Bellows.**



## THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

### Reduced Price List, FEBRUARY 1, 1877.

For dimensions of Governor, see Illustrated Price List.



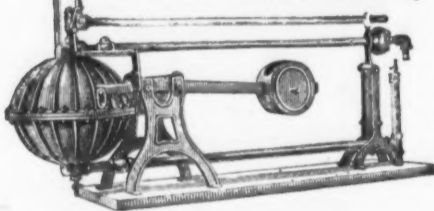
THE JUDSON PATENT Improved Steam Governor.

Size, Inch.	Plain.	Right Fin. Isked.	Extra for Stop Valve.
1/2	\$16 00	\$18 00	\$1 00
3/4	18 00	20 00	1 00
1	20 00	22 00	2 00
1 1/4	23 00	26 00	2 25
1 1/2	26 00	30 00	2 50
2	31 00	35 00	2 75
2 1/4	36 00	41 00	3 25
2 1/2	40 00	45 00	3 50
3	45 00	51 00	3 75
3 1/4	50 00	57 00	4 25
3 1/2	55 00	62 00	4 50
4	60 00	68 00	5 00
4 1/4	65 00	73 00	5 50
4 1/2	70 00	78 00	6 00
5	75 00	83 00	6 50
5 1/4	80 00	88 00	7 00
5 1/2	85 00	93 00	7 50
6	90 00	98 00	8 00
6 1/4	95 00	103 00	8 50
6 1/2	100 00	108 00	9 00
7	105 00	113 00	9 50
7 1/4	110 00	118 00	10 00
7 1/2	115 00	123 00	10 50
8	120 00	128 00	11 00
8 1/4	125 00	133 00	11 50
8 1/2	130 00	138 00	12 00

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

## The Albany Steam Trap.



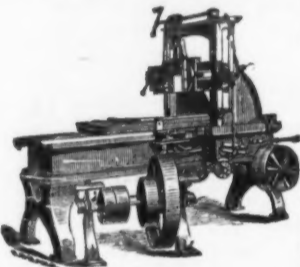
This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company, Albany, N. Y.

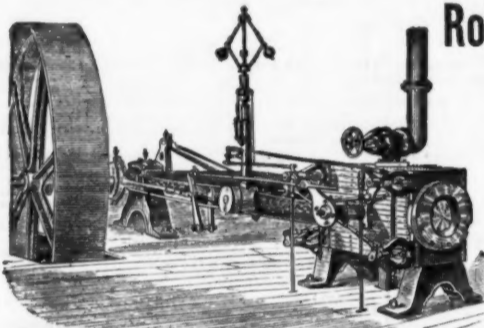
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Have constantly on hand and making

## Drop Hammers



Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



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PORTABLE DRILLS. Driven by power in any direction. RADIAL DRILLS. Self-feed—Large Adjustable Box Table. VERTICAL DRILLS. Self-feed. 3 to 20 Spindles. MULTIPLE DRILLS. 3 to 20 Spindles. HORIZONTAL BORING AND DRILLING MACHINES. HAND DRILLS. CAR BOX DRILLS. SPECIAL DRILLS. For Special Work.

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It Has More Good Points, Less Complication, More Adaptability, Larger Capacity, Does More and Better Work, Takes Less Power, Costs less for Repairs than any Hammer in the World. GUARANTEED AS REPRESENTED, and "DON'T YOU FORGET IT."

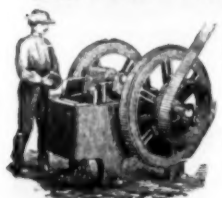
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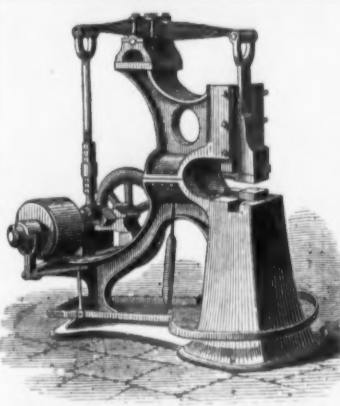
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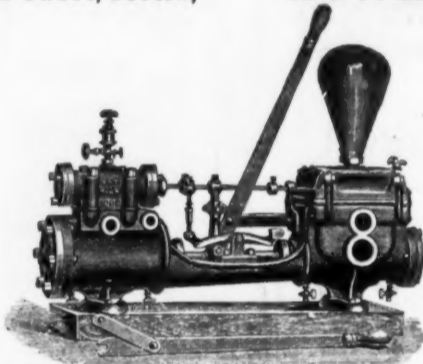
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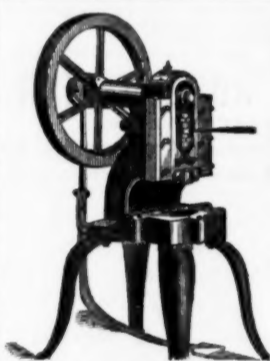
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Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the best. Every machine furnished under a complete guarantee.



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I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

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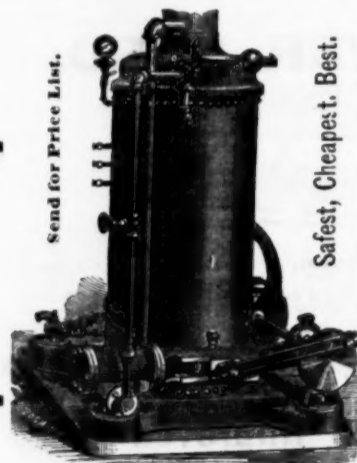
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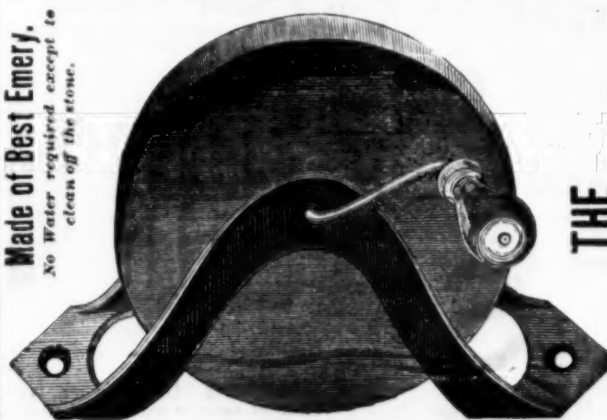
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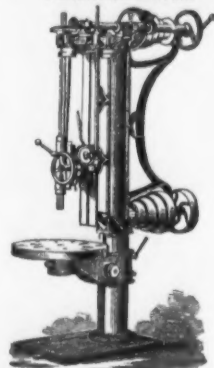


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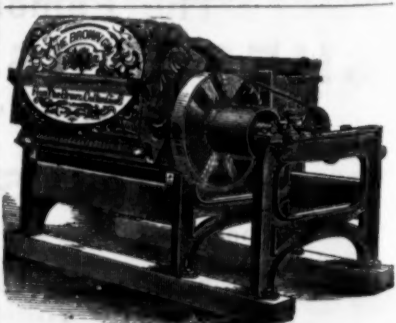
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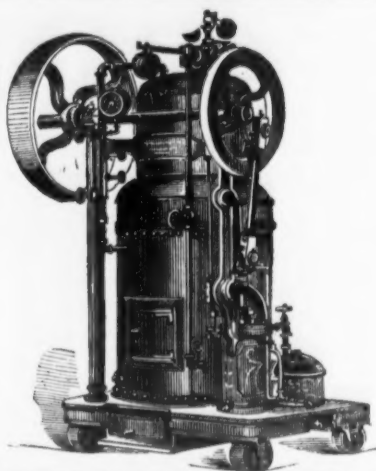
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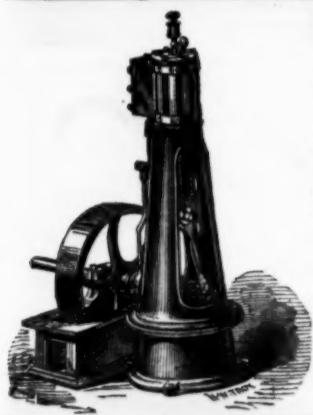
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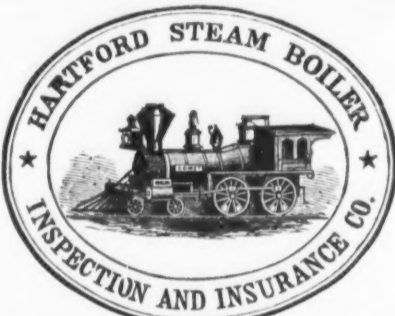
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RAILWAY SHOP EQUIPMENTS.Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters  
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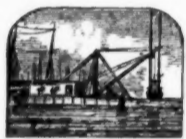
Full information concerning the plan of the Company's operations can be obtained at the  
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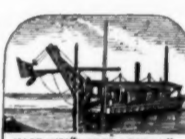
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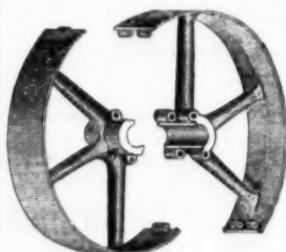
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A true copy from the Report on file.  
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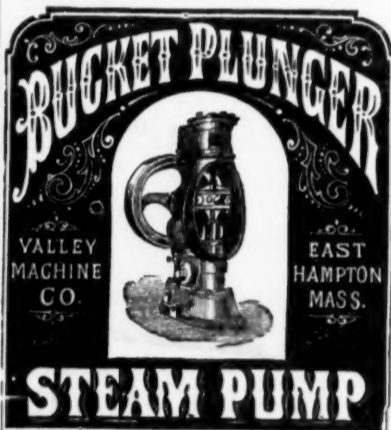
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Drive Well Material a Specialty.

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## FRICTION PULLEYS

Friction Clutches

For Connecting Shafting and Gearing.

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A ..... 25c		F. ....	11c

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BRASS CASTINGS, 21 to 35c. INGOT BRASS, 19 to 22c. BRASS TURNINGS AND OLD METALS WANTED.

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MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

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Invaluable for all articles requiring great strength and durability. Send for Circular.

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Light and Heavy STEEL CASTINGS of superior quality made on short notice, true to pattern, solid, strong and durable, can be readily forged and tempered.

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BOILER HEADS & FLUE HOLES  
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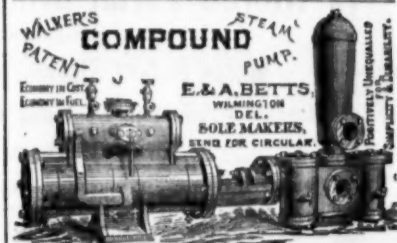
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Office A. WILT & SON,  
Door, Sash, Shutter, Window Frame and Molding Manufactory, General Wood Working Mills,  
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